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THE
Philosophy of Medicine:
BEING
MEDICAL EXTRACTS,
ON THE
NATURE AND REMOVAL
OF
DISEASE.

BY
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Member of the University of Cambridge, and of the Royal London
College of Physicians, &c. &c.

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1813.

Philosophy of Medicine

MEDICAL EXTRACTS

THE LANCET AND THE LANCET

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THE
P R O G R E S S
OF
Medicine.

“ If I had foreseen all the weight of *opposition* that has arisen against me. I would have left to others the pursuit of fame, which is an empty shadow: but the reflection of being of service to my fellow creatures, affords a *return* for the inquietudes ever attendant upon literary exertions.”——*Vide Sir ISAAC NEWTON's Letter to Dr. Bentley.*

AS long as PHILOSOPHY was built, not upon the substantial basis of actual experiment, but imagined properties, which were assumed as data, it was putting on new forms almost every day; for one fanciful opinion had always a right to supplant another. Hence the best philosopher in those days was him who could reason most ingeniously on occult qualities,* either invented by himself, or by some favourite writer.

Lord Chancellor BACON was the first who discovered the fallacy of this sort of philosophy. He rejected all that chimerical nonsense, which had usurped the name of

* Hence we shall omit the history of the early periods of medicine, which may be seen in our former edition.

philosophy, and wisely exclaimed, "Non fingendum, aut exçogitandum, quid Natura feret et faciat, sed invenien-
dum est." That the operations of nature were not to be fancied, but diligently scrutinized. Hence, in less than the space of a century, the principle of philosophizing being altered, more light was thrown upon every branch of science, than it had received for above two thousand years before.

The discovery of the *circulation of the blood* first immortalized the name of HARVEY. It may appear wonderful, and at the same time not a little mortifying to the vanity of mankind, that a motion in the frame, which constitutes the basis of life, and which chance must have made us sensible of a thousand times, should have escaped the eyes of all who imagined themselves to be observers, and some of whom were actually such. When the doctrine of the circulation of the blood could no longer be resisted, various unsuccessful attempts were then made to prove that it was known long before; so was it with COLUMBUS who discovered a new world, which occasioned him to make this simple proposal to his opposers, namely, "*to place an egg upright.*" All attempted, but in vain. This illustrious navigator then *himself* broke the end, and "*the egg stood up.*" "*The thing,*" says he, "*is very easy when known,*" and ENVY itself was abashed. Thus attraction, the weight, and elasticity of the air, shewed themselves to the senses every day; but it required a TORRICELLI and a NEWTON to illustrate them.

The discovery of the next importance is *irritability*, a property essential to all animals, likewise to all plants, and which henceforth will justly be ranked amongst the principal qualities of all organized animated beings. This discovery confirms the more honour on Baron de HALLER, as it was made in an enlightened period, and upon a sub-

ject so much searched after as the human body. This discovery also, like the other, met at first with violent opposition, and from similar motives: **INDOLENCE**, to avoid the trouble of an examination; **VANITY**, to shun the imputation of ignorance; and **ENVY**, to deprive the discoverer of his praise. Hence its existence was first flatly denied; and after it was confirmed by the strongest facts, so that it was impossible for the most stubborn prepossession to challenge the truth of it, the merit of the discovery was then attempted to be wrested from the author.

In like manner the science of *chemistry* has had its revolutions, and one error succeeded to another, until the illustrious Dr. **PRIESTLEY** discovered **VITAL AIR**, the *sine quá non* of all animal and vegetable life. With that greatness of mind, so peculiar to this philosopher, he had the courage to inhale this factitious air. He declares he felt for some time afterwards "his breast peculiarly light and easy." He conjectures from the greater strength and vivacity of the flame of a candle in **VITAL AIR**, "that it might be peculiarly salutary in all cases of weakness, or a want of energy in the system.—Hitherto," he adds, "only two mice and myself have had the privilege of breathing it."

Speaking of *factitious airs* in general, he says, "I cannot help flattering myself, that, in time, very great medicinal use will be made of the application of these different kinds of air to the animal system. Let **INGENIOUS PHYSICIANS** attend to this subject, and lay hold of the *new handle*, which is now presented them, before it be seized on by **RASH EMPIRICS**; who, by an indiscriminate and injudicious application, often ruin the credit of things and processes, which might otherwise make an useful addition to the *materia and ars medica*."

It is not in the order of this work to trace here minutely the progress of the *pneumatic practice* of physic, we shall therefore pass over the testimonies of Dr. PERCIVAL, &c. respecting the salutary effects of FIXED AIR in consumption, mortification, and ulcers, and hasten briefly to record the introduction of the OXYGENATED NITROUS ACID VAPOURS, for arresting the progress of *contagious fever*.

In the year 1782 an infectious fever broke out among the prisoners in Winchester. This excited the attention of Parliament, and many eminent physicians in London were applied to, to take charge of the prisoners there; but they refused venturing upon so hazardous an office. The late Dr. FOTHERGILL then waited on Dr. SMITH, and requested him, in the most urgent manner, to accompany the commissioner to Winchester. Two hundred and forty persons had already perished by this dreadful malady, whose violence seemed daily increasing. Most of the officers and servants belonging to the hospital had fallen victims to this fatal distemper. But such was the powerful influence of the NITROUS ACID VAPOUR, the number was reduced to 9, 5, 3, and 2,—and afterwards none died. Dr. CARMICHAEL SMITH himself was seized with this disorder, and confined to his bed, yet, like a true hero, he would not yield to his disease, but continued to give directions. In a memorial which he afterwards sent to the minister of state, in mentioning these circumstances, he says, “ But these, my lord, are only the sufferings of
“ an individual. I readily complied with your lordship’s
“ wishes, and as to the conditions of my attendance I
“ made none: convinced that no pecuniary recompence
“ could be an adequate compensation to me, circum-
“ stanced as I then was, for the risk I ran; and that if I
“ was fortunate enough to survive, and *succeed*, I was

“ certain of the first of all rewards, the *consciousness* of
 “ having *discharged* a *duty* to which I was *called* by the
 “ *voice* of *my country*, and in the event of which the
 “ national as well as my own honour was involved. My
 “ endeavours have been attended with a success which
 “ even my friends could hardly expect, and which I be-
 “ lieve stands *without example* in the annals of physic. I
 “ have already received from the *public* the fullest appro-
 “ bation of my conduct, and make no doubt that, in con-
 “ sequence of your lordship’s favourable representation of
 “ it to the *king*, I shall receive from his Majesty, ever
 “ attentive to reward merit in the lowest of his subjects,
 “ some mark of his Majesty’s royal favour.” In conse-
 quence of which discovery, he was appointed physician
 extraordinary to the king.

This *antiseptic vapour* was afterwards applied, in the
 year 1795, by the order of the Lords Commissioners of
 the Admiralty, on board the Union hospital ship, and
 with the same happy success.*

Near about the same time in France a very important
 discovery was made. Mons. DE MORVEAU, the associate
 of LAVOISIER and FOURCROY, employed for the same
 purpose the OXYGENATED MARINE ACID in the
 form of air, or vapour, and purified the infected hospital
 at Dijon. This method was afterwards extended to the
 different military hospitals by a decree of the national
 assembly.

Since there is no disorder to which human nature is
 subject, more destructive or more alarming than contagious
 fever, the humane reader will not require an apology for

* Vide *An Account of the Experiment made on board the Union hospital ship, to determine the Effect of the Nitrous Acid Vapour in destroying Contagion, in a Letter addressed to the Right Hon. Earl Spencer. By James Carmichael Smith, M.D.*

delaying his attention upon so important a point, more especially as it confers the highest honour on the present enlightened age, and holds out a prospect that one of the greatest scourges to mankind will be at last banished from the earth, never again to rear its truly formidable head.

As Dr. CRAWFORD, brother to the late celebrated Dr. ADAIR CRAWFORD, of whom we may justly say,

————— Par nobile fratrum,

was returning to England from India, in the year 1770, on board the Earl of Middlesex, an epidemic fever broke out among the crew, which seemed to threaten an alarming mortality.* Thirty of the men were seized with the characteristic symptoms of this disease. Three of the unhappy sufferers early perished. On each side the eye was now saddened with the despondence which was visible in every countenance: and the ear was distracted with the groans and difficult respiration of those who suffered, or by the foreboding of such as had hitherto escaped. Nor was the situation of this compassionate physician less lamentable than the rest. The uplifted eye implored for help in vain! He had no clue to conduct him in his present difficulty. But the man of science does not soon yield up to despair. He investigates the hidden causes of disease, and Nature in her bounty not unfrequently blesses the laudable endeavour. From the accurate and ingenious experiments of Dr. ADAIR CRAWFORD, it appears, that when an animal is immersed in hot water, the veins pour out upon venesection, not a black, but florid, blood; and other observers have also noticed, that blood taken from the arm in summer is of a brighter hue than in winter.

* For an account of this fever, vide *An Essay on Fever, accompanied with a Disease of the Liver, hitherto but little known, though very frequent and fatal in warm Climates.*

Hence it is reasonable to suppose, that as the liver is an organ destined by nature to receive black, or venal blood, that this dark blood is intended to be a sufficient stimulus; but when, on the contrary, that organ receives florid or arterial blood, that the stimulus is then too great, and inflammation of that viscus ensues. Perhaps under this persuasion (for the Earl of Middlesex was now near the tropic), or from its acknowledged utility, Dr. CRAWFORD opened one of the dead bodies, and had a demonstrative proof that the liver was the chief seat of the present disease. It was not only enlarged, but externally shewed a *florid* appearance. Upon this discovery he had instant recourse to bleeding and mercurial cathartics, and he observed, that where the mercury produced *salivation*, the recovery was more striking, and he therefore exhibited mercury also with this intention.

On the 20th of May this fever attacked JOHN MASON, a strong athletic sailor. I ordered, says Dr. CRAWFORD, sixteen ounces of blood to be taken from him. The pulse rose immediately in fulness, and his respiration became easy. Three of the aperient pills (these were composed of mercury, aloes, soap, and jalap) were administered, and the same quantity repeated in the evening, which produced a sufficient effect. These were continued each day, so that he had taken now about half a drachm of calomel. On the 25th, his mouth was a good deal affected, and all uneasiness in breathing was instantly removed. On the 27th, the salivation abated considerably, when his respiration became proportionably oppressed, he therefore returned to the use of the pills. On the 28th, the salivary discharge was again abundant, and it is not a little remarkable, Dr. CRAWFORD adds, "that as this increased, the difficulty of breathing, and all the other symptoms of the disease, diminished." This observation led me,

he adds, to keep up the spitting for a few days, at the same time care was taken to prevent it from being too copious.* On the 29th, 30th, and 31st, the soreness of the mouth was the only disease, and this decreasing, the sailor was soon restored to sound health.

This practice has been since pursued with equal success by Dr. WADE, in Bengal, in the year 1791, and by Dr. CHISHOLM in the island of Grenada, for the cure of the yellow, or bilious autumnal, fever. Dr. WADE did not lose one patient, and Dr. CHISHOLM lost only one out of forty-eight patients, in whom the mercury affected the salivary glands. The latter gave 150 grains of calomel, and applied the strongest mercurial ointment below the groin on each side in several cases. He declares, that not only the cure was speedy, but that not a single relapse occurred where the fever was cured by *salivation*.

I prescribed, says Dr. RUSH, speaking of the late pestilential fever in Philadelphia,† bark in large quantities; in one case I ordered it to be injected into the bowels every four hours. I directed buckets full of cold water to be thrown frequently upon my patients. The bark was offensive to the stomach, or rejected by it, in every case in which I prescribed it. The cold bath proved grateful, but no otherwise salutary. Three out of four of my patients died to whom the cold bath was administered in addition to the tonic remedies before mentioned. Baffled in every attempt to stop the ravages of this fever, I anti-

* When violent salivation came on, this able practitioner had recourse to opium. This often occasioned violent torment in the bowels, which was as instantly removed by juice of limes.

† Vide Dr. Rush's account of the bilious remitting yellow fever, as it appeared in the city of Philadelphia in the year 1793. Also Vol. II. p. 174, fifth edition of our work, where the history of this fever is given, and its *relation to the state of the atmosphere* is set forth.

cipated all the numerous and complicated distresses in our city, which pestilential diseases have so often produced in other countries. The fever had a malignity, and an obstinacy which I had never before observed in any disease, and it spread with a rapidity and mortality, far beyond what it did in the year 1762. Nevertheless I did not abandon a hope that the disease was curable, for I had long believed that good was commensurate with evil, and that there does not exist a malady but would yield to our knowledge of the laws of the animal œconomy. Under the impression of this belief, I applied myself with fresh ardour to the investigation of the present disease. I ransacked my library, and pored over every book that treated of the yellow fever. The result of my researches for a while was fruitless. The accounts of the symptoms and cure of the disease, by the authors I consulted, were contradictory and uncertain. Before I desisted from the inquiry to which I had devoted myself, I recollected that I had, among some old papers, a MS. account of the yellow fever as it prevailed in Virginia in the year 1741, which had been put into my hands by Dr. FRANKLIN, a very short time before his death. I had read it formerly, and made extracts from it. I now read it a second time. I paused upon every sentence; even words in some places arrested and fixed my attention. In reading the history of the effects of different modes of treatment, I was much struck with the following passages:

“ It must be carefully noted, that *evacuations* are more
 “ necessary in the yellow fever, than even in the inflam-
 “ matory. The abdominal viscera are the parts princi-
 “ pally affected in this disease,—and by this timely e-
 “ vacuation, their feculent, corruptible, and irritating con-
 “ tents are discharged before they overpower the whole
 “ constitution. They always require some *evacuation* to
 “ bring them to a perfect crisis. Where the primæ viæ,

“ but especially the stomach, is loaded with the poison of
 “ the contagion, and convulsed with the irritation of this
 “ stimulus, there is no procuring a desirable sweat, until
 “ this is removed. Also by *evacuating* the bowels, the
 “ seeds of the disease, which is mixed with the bilious
 “ and inguinile matters in the intestinal canal is nipped
 “ in its birth, and a breathing sweat then breaks out of
 “ its own accord. I can affirm, that I have often given
 “ *evacuants*, when the pulse has been so low that it could
 “ be hardly felt, and the debility extreme, yet both one
 “ and the other have been restored by it.”

In my attendance upon the military hospitals during the late war, I had often seen, continues Dr. Rush, calomel combined with jalap, administered in the bilious autumnal fever by Dr. Young. His usual dose was ten grains of each of them. This was given once or twice a day, until it procured large evacuations from the bowels. It was adopted by several of the surgeons of the hospitals, and was universally known, and sometimes prescribed, by the simple name of *ten and ten*. I resolved, therefore, after mature deliberation, to prescribe this purge in the present fever. Finding ten grains of jalap insufficient to carry the calomel through the bowels in the rapid manner I wished, I added fifteen grains of the former to ten of the latter. I then issued three doses, each consisting of fifteen grains of jalap, and ten of calomel; one to be given every six hours, until they procured four or five large evacuations. The effect of this powder not only answered, but far exceeded my most sanguine expectations. It perfectly cured four out of the first five patients to whom I gave it, notwithstanding some of them were advanced several days in the disorder! Mr. Richard Spain, a block-maker, in Third-street, took eighty grains of calomel, or rather more, with rhubarb and jalap mixed with it, on the last day of August,

and on the first day of September. He had passed twelve hours, before I began to give him this medicine, without a pulse, and with a cold sweat on all his limbs. His relations had given him over, and one of his neighbours complained to me, of my not advising them to make preparation for his funeral. But in this awful situation I nevertheless gave them hopes. My medicine operated well. His pulse immediately rose, and an universal moisture on his skin succeeded the cold sweats on his limbs. In a few days he was out of danger, and he now lives in good health, as the first fruits of the efficacy of *mercurial purges* in the yellow fever. After such a pledge of the safety and success of my new medicine, I gave it afterwards with confidence. I imparted the prescription to the College of Physicians on the third of September, and endeavoured to remove the fears of my fellow citizens, by assuring them that the disease was no longer *incurable*. Mr. Lewis, Dr. McIlvaine, Mrs. Bethel, her two sons, and a servant-maid, and Mr. Baynton's whole family, nine in number, were some of the first trophies of this *new* remedy. The credit it acquired brought me an immense accession of business. It was uniformly effectual in all whom I attended, either in my own person, or by my pupils. Dr. GRIFFITH, Dr. SAY, Dr. PENNINGTON, and my former pupils, who were settled in the city, Drs. LEIB, PORTER, ANNAN, WOODHOUSE, and MEAR, were among the first physicians who adopted it. In my note-book I put down, "Thank God! out of one hundred patients, whom I have visited, or prescribed for, this day, I have lost *none*;" nor shall I ever forget the transport with which Dr. PENNINGTON ran across the street to inform me, a few days after he began to give strong purges, that the disease yielded in every instance.—But I did not rely on purging alone to cure the disease. Conceiving it to depend upon a morbid *stimu-*

lus, acting upon and overpowering the system, I was led to use those remedies which we know abstract stimuli in general. These were blood-letting, cool air, cold, watery, and sub-acid drinks, low diet, and the application of cold water to the body. My success with this practice was beyond measure great, never before did I experience such sublime joy. It repaid me for all the toils and studies of my life; and the conquest of this disease was not the effect of accident, nor of the application of a single remedy; but it was the triumph of a PRINCIPLE in *Médecine*!

“ During the course of my extensive practice, the exhibition of calomel purges produces frequently *salivation*. “ By this accidental effect of mercury, I was taught to “ administer it with other views, than merely to cleanse “ the bowels, and with a success which added much to my “ confidence in the power that this medicine has over the “ disease*. I began by prescribing the calomel in small “ doses, at short intervals, and afterwards I directed large “ quantities of the ointment to be rubbed upon the limbs. “ The effects of it, in every case where the mouth was “ affected, was very salutary and speedy, and even several “ persons appeared to be benefitted by the mercury introduced in the system in the form of an ointment, where “ it did not produce salivation. In the lowest stage of the “ fever I ordered, in one case, an ounce of mercurial ointment to be rubbed in. The next day the gentleman “ complained of a sore mouth, and in the course of twenty- “ four hours he was in a moderate salivation. From this “ time, his pulse became full and slow, and his skin moist. “ His sleep and appetite suddenly returned, and in a day “ or two he was out of danger. Dr. WOODHOUSE im-

* Vide Vol. III. p. 650, fifth edition of our work, where mercury is shewn to be a cure of *hydrophobia*, and hereafter it may be found to be the sovereign antidote against all other animal and most vegetable poisons.

“ proved upon Dr. Rush’s method of exciting salivation,
 “ by rubbing the gums and inside of the cheeks with calo-
 “ mel, in the manner directed by Mr. *Clare*, and it was
 “ observed to be more speedy in its operation this way,
 “ and equally successful.”

Since the discovery, that mercurial oxyds (mercury combined with OXYGEN) is of great efficacy in the cure of putrid fever, another remedy has been much recommended by Dr. WOOD. “ From the accurate observations, which
 “ have been lately made,” says this ingenious physician,
 “ on the effects of VITAL AIR on the blood, both in the
 “ state of circulation, and when drawn from a vein, and
 “ allowed to cool; from the difference of colour of the
 “ returning blood, with that which has just passed through
 “ the lungs; and from our knowledge, that the red glo-
 “ bules are oxydes; and from the similar appearance,
 “ which the blood, in a person labouring under typhus,
 “ has with the returning venous blood; and from the
 “ anxiety of respiration, which they who labour under
 “ typhus fever always discover,—we can have little doubt,
 “ I think, for supposing that the deficiency of OXYGEN
 “ is the cause of the symptoms of typhus, the principal of
 “ which are, besides those above-mentioned, universal
 “ debility, and a rapid tendency to a putrescent state.
 “ Hence we may conclude that OXYGEN is the general
 “ and only corrector of this state, that it is the grand anti-
 “ septic of nature, and therefore with the decrease of
 “ OXYGEN, will increase the tendency to putrefaction,
 “ and with the increase of the tendency to putrefaction,
 “ will the *irritability* be exhausted, and symptoms of *debi-*
 “ *lity*, in both body and mind, be progressively evident.
 “ The proximate cause of typhus fever can therefore only
 “ be removed, as must appear from what has preceded, by
 “ the application of OXYGEN in a sufficient quantity to

“ correct this deficiency, and to restore the state of equi-
 “ brium. OXYGEN taken into the stomach in the com-
 “ bined state of many different *acids**, may answer this
 “ intention ; but in the state of *nitre*† it seems to me the
 “ most powerful form of exhibiting it; the process for
 “ obtaining OXYGEN in the state of *gas*, in order to
 “ throw it into the system by the lungs, is not only tedious
 “ but difficult. In the state, therefore, of combination
 “ with *nitre*, it appears to me at present the most effectual
 “ mode of throwing it into the system. I have lately, con-
 “ tinues Dr. WOOD, exhibited *nitre* to more than fifty
 “ patients labouring under typhus ; many of whom, when
 “ I saw them, had all the symptoms of this disease in a
 “ most violent degree. I did not give any previous anti-
 “ monial ; but I exhibited immediately the solution of
 “ *nitre*. In some of the patients, the pulse, which was
 “ from 100 to 130, was diminished in frequency, and
 “ increased in strength, before the expiration of the first
 “ 24 hours ; the change, indeed, was often so great and
 “ sudden, that I could scarcely credit my own senses,
 “ until repeated experience stamp’d the firmest conviction
 “ upon my mind. Previous to the practice which I now
 “ pursue, I never visited in typhus, without experiencing
 “ some of those feelings, which the physician is obliged to
 “ suffer, who expects an unsuccessful issue ; but now I
 “ have no fears, and I trust that one of the most crowded
 “ avenues to the grave is at length closed, and, judging

* The yellow fever prevailed at the Caraccas, in South America, in Oc-
 tober, 1793, with great mortality. Nearly all died who were attended by
 physicians. Recourse was finally had to an old woman. Her remedy was
 a liquor called *narencado*, a species of *lemonade*. With this she drenched
 her patients for the first two or three days. It induced plentiful sweats,
 and probably, after correcting, discharged the acrimony of the bowels.—
 Dr. RUSH.

† Vide Vol. I. page 44, fifth edition of our work.

“ from the rapid progress acquired in the knowledge of
 “ philosophy and medicine within a very few late years, I
 “ may venture to predict, that by similar attempts, every
 “ disease, whose nature is at present obscure, will be at
 “ last clearly explained, and the professors of medicine
 “ be finally in possession of the *ne plus ultra* of their
 “ science.”

In these trials the *vital principle* was attempted to be restored as fast as it was consumed by the excessive stimulus of the contagious matter taken into the system, and producing the putrid fever, or this stimulus was attempted to be evacuated ; but this enlightened age has also produced another philosophical method, namely, its *correction*.
 “ Seventeen years ago I went,” says the Rev. Mr. CARTWRIGHT, “ to reside at Brampton, a very populous village near Chesterfield. I had not been there many months before a putrid fever broke out among us. Finding by far the greater number of my new parishioners much too poor to afford themselves medical assistance, I undertook by the help of such books on the subject of medicine, as were in my possession, to prescribe for them. I early attended a boy about 14 years of age, who was attacked by this fever. He had not been ill many days before the symptoms were unequivocally putrid. I then administered bark, wine, and such other remedies as my books directed. My exertions, however, were of no avail ; his disorder grew every day more untractable and malignant, so that I was in hourly expectation of his dissolution. Being under the absolute necessity of taking a journey before I set off I went to see him, as I thought for the last time, and I prepared his parents for the event of his death, which I considered as inevitable, and reconciled them in the best manner I was able, to a loss which I knew they would feel severely. While I was in con-

“ conversation on this distressing subject with his mother, I
 “ observed, in a corner of the room, a small tub of wort
 “ working. The sight brought to my recollection an
 “ experiment I had somewhere met with, *of a piece of*
 “ *putrid meat being made sweet by being suspended over a*
 “ *tub of wort in the act of fermentation.* The idea instantly
 “ flashed into my mind that the yeast might correct the
 “ putrid nature of this disease, and I instantly gave him
 “ two large spoonfuls. I then told the mother, if she
 “ found her son better, to repeat this dose every three
 “ hours. I then set out for my journey. Upon my
 “ return after a few days, I anxiously enquired about the
 “ boy, and was informed he was recovered. I could not
 “ repress my curiosity, though I was greatly fatigued
 “ with my journey, and night was come on; I went
 “ directly to where he lived, which was three miles off,
 “ in a wild part of the moors. The boy himself opened
 “ the door, looked surprisingly well, and told me he felt
 “ better from the instant he took the yeast.

“ After I left Brampton I lived in Leicestershire. My
 “ parishioners being there few and opulent I dropped my
 “ medical character entirely, and would not even prescribe
 “ for any of my own family. One of my domestics falling
 “ ill, accordingly the apothecary was sent for. His com-
 “ plaint was a violent fever, which, in its progress,
 “ became putrid. Having great reliance, and deservedly,
 “ on the apothecary’s penetration and judgment, the man
 “ was left solely to his management. His disorder, how-
 “ ever, kept daily gaining ground, till at length the apothecary
 “ considered him in very great danger. At last,
 “ finding every effort to be of service to him baffled, he
 “ told me he considered it as a lost case, and that, in his
 “ opinion, the man could not survive four and twenty
 “ hours. On the apothecary thus giving him up, I deter-

mined to try the effects of the *yeast*. I gave him two
 large table spoonsful. In fifteen minutes from taking the
 yeast his pulse, though still feeble, began to get com-
 posed and full. He, in thirty-two minutes from his
 taking the yeast, was able to get up from his bed, and
 walk in his room. At the expiration of the second hour,
 I gave him a bason of sago, with a good deal of *lemon*,
 wine, and ginger in it; he eat it with an appetite: in
 another hour I repeated the yeast: an hour afterwards I
 gave the bark as before: at the next hour he had food
 next he had another dose of yeast, and then went to bed,
 it was nine o'clock. I went to see him the next morn-
 ing at six o'clock; he told me he had a good night, and
 was recovered. I however repeated the medicine, and
 he was able to go about his business as usual.

About a year after this, as I was riding past a
 detached farm-house, at the out-skirts of the village, I
 observed a farmer's daughter standing at the door, appa-
 rently in great affliction. On enquiring into the cause
 of her distress, she told me her father was dying. I dis-
 mounted and went into the house to see him. I found
 him in the last stage of a putrid fever; his tongue was
 black; his pulse was scarcely perceptible; and he lay
 stretched out, like a corpse, in a state of drowsy insen-
 sibility. I immediately procured some *yeast*, which I
 diluted with water, and poured it down his throat.
 I then left him with little hopes of recovery. I returned
 to him in about two hours, and found him sensible and
 able to converse. I then gave him a dose of bark. He
 afterwards took, at a proper interval, some refresh-
 ment. I staid with him till he repeated the yeast,
 and then left him with directions how to proceed. I
 called upon him the next morning at nine o'clock. I

“ found him apparently well, walking in his apartment.

“ He was an old man, upwards of seventy.

“ I have since administered the yeast to above fifty
 “ persons labouring under putrid fever, and what is singular, continues this benevolent clergyman, I have not lost
 “ one patient.”

Dr. Thornton, whose opportunities have been great in putrid fever, having the superintendence of a dispensary*, which includes the poor of nine parishes, and is situate in the vicinity of St. Giles, has made frequent trials of yeast, and speaks highly in its praise.

One day, says the Rev. Mr. Townsend, by accident, as Dr. Thornton went past a shop† in Tottenham-court Road, he heard the screams of a mother, who was agonized on seeing her child expire. These screams renewed the struggles of the child, and the nurse who attended, threatened to take away at this moment the child, that it might die in quiet. Dr. Thornton got down immediately some tartar emetic, which quickly acted as a vomit; and after the operation was over, he gave rhubarb, which cleared the intestines; he then ordered the child every two hours *yeast* and water, with wine and bark, and in three days the dying child was up and well.

The infection had spread to two others in the same house. In this child, and in another, the putrid fever was attended with swelled glands, which suppurated, and threatened gangrene. In a robust servant girl, it took the form of a dreadful putrid sore throat. She had an emetic, and afterwards some rhubarb, then yeast and water every two hours. The first effects of this newly discovered remedy, was that of rendering the pulse fuller and fifteen beats less

* The St. Mary-le-Bone General Dispensary.

† Mr. Burford's.

in a minute, and her black tongue soon assumed a clean and red appearance. Without bark or wine she was speedily recovered.

In Dr. Beddoes' Considerations there are the following extraordinary cures. Mr. Caldwell, engraver, requested Dr. Thornton to go into Green-street, Leicester-fields, to attend Mr. Hadril, who, he said, it was supposed would not out-live the day. He found him labouring under a dreadful putrid sore throat; the tongue was black and thick coated, and the pulse quick and fluttering. Evacuations being first premised, yeast and bark in porter, were exhibited every two hours. His sister, who nursed him, was soon after attacked by the same fever, but the throat was not affected. She was not like her brother, confined to her bed, but her weakness was so great that she could not walk across the room, nor even stand up half a minute without support. In both these cases the relief from the yeast was very striking, and they were soon cured. The wife was also infected, who received a similar benefit from yeast.

The most extraordinary cases, however, are the following:—In Husband-street, a small confined situation, near Berwick-street, a fever broke out, which in the short space of a fortnight, in three houses only, swept away six persons. Dr. Thornton's assistance was at this time called in to Mrs. Woolcott, No. 1, in that street, who lay delirious and comatose, with her two children, all in the same bed. She refused medicine and food, and was obliged to be drenched, in order to get either down. An emetic and cathartic being premised, they were all put upon the same plan, that is, were to take every three hours two-thirds of a glass of fresh porter, with two table spoonfuls of yeast, and the juice of half a lemon, and the food, at intervals, was the whites of eggs, which Dr. Thornton judged, of all

things, were least subject to putrify*, beat up with some sugar and water, and as it was the commencement of summer, strawberries were also ordered; and without any farther medicine from the apothecary than the emetic and purge, although the woman was at first obliged to be drenched, yet she and her whole family recovered, and this very rapidly.

Among the poor in St. Giles's nothing is administered by Dr. Thornton, after cleansing the primæ viæ, than two table spoonfuls of *yeast*, in some porter, every two hours; and out of above forty cases not one has died under this treatment; and when we consider the difficulty there often is to make children take bark, and its frequent inefficacy, yeast must be considered as a very valuable acquisition to the *ars medendi*.

Another method of cure, combining all the three foregoing, is that adopted by Dr. Thornton, and recorded by the Rev. Mr. Townsend in *the Elements of Therapeutics*†. Dr. Thornton considers the contagious matter, productive of putrid fever, as a violent stimulus, which resembles the operation of wine‡ or opium§, first increasing the action of

* We know that eggs are kept for a great length of time, and the white, even under the heat of the hen's body, does not putrify, and it serves as milk to the embryo in the egg.

† This admirable work treats of *the symptoms and nature of diseases, and their cure*.

‡ I once saw an instance, says Dr. Beddoes, in which I could not doubt that complete *intoxication* was produced by the contagion of typhus, to which the person had been much exposed. One morning, immediately upon rising, and I knew he had drank nothing the night before, I was astonished to observe that flighty vivacity and disposition to wild disjointed talk, together with the other signs which infallibly denote a certain degree of intoxication, especially when you are well acquainted beforehand with the manners of the party. In the course of the day, during which I saw him frequently, he became heavy, had febrile shiverings, and complained of head-ach. The next day he became more feverish, but was not con-

“ the heart and arteries, and after a few days, having
 “ worn down the excitability, the sthenic diathesis is suc-
 “ ceeded by the asthenic or putrid. He therefore advises
 “ to *expel* this morbid and excessive stimulus by evacua-
 “ tions* ; secondly, to *correct* this stimulus, which may
 “ be accomplished by antiseptics† ; and thirdly, to *supply*
 “ the principle of irritability, which may be done by
 “ oxyds, or the inhalation of factitious vital air.

“ When my physician Dr. Thornton,” says the Rev.
 Mr. Townsend, “ who had recovered me, when in the
 “ worst stage of a putrid fever, was returned to town, he
 “ was called in for his advice, respecting two children
 “ labouring under the same species of fever. As the
 “ eldest child appeared to be in the greatest danger, with
 “ a becoming diffidence of a *new practice*‡, he desired the
 “ father to allow him to accept her only as his patient,
 “ and that the apothecary should go on with the youngest.
 “ He gave instantly an emetic of tartarized antimony and
 “ ipecacuanha ; and after the operation was fully over,
 “ and a little nourishment got down, he followed it up
 “ with rhubarb and tartarized kali, supporting the patient
 “ at intervals with wine. When the bowels were clear,
 “ he ordered, at regular intervals, an infusion of bark in

fined till the fifth day, though the head-ach and other symptoms never
 quitted him. He then passed into putrid fever, which continued until
 the twenty-first day, when he recovered. Does not the alkaline urine in
 such persons denote, continues Dr. Beddoes, a deficiency of the oxygen?

§ Vide Vol. III. p. 625. Sect. LII. *Of Asphyxia from opium*, fifth edi-
 tion of Medical Extracts.

* During the late war in America, an *emetic* seldom failed of prevent-
 ing an attack of putrid fever, when given in its forming stage. Vide *Rush*
on the Yellow Fever, p. 336.

† Chiefly such as impart *fixed air*.

‡ *Evacuations* in putrid fever. This practice was followed previous to
 the appearance of the *yellow fever* in America. Vide the *Letters of Dr.*
THORNTON, &c. to *Dr. BEDDOES*.

“ port wine, impregnated with FIXED AIR, and her
 “ drink was water acidulated with FIXED AIR and
 “ tamarinds. Mild cathartics were exhibited each night,
 “ and the antiseptic remedies were lessened, and his
 “ patient inhaled air blended with factitious VITAL AIR.
 “ Dr. Thornton then went into the country to see some
 “ particular friends, and on his return he hastened to visit
 “ these children. He found his little patient in perfect
 “ health and blooming; but the situation of the other
 “ child was far different. As he entered the house, the
 “ father informed him, that his child was at the point of
 “ death, and all he could hope from him now was, in
 “ some degree to palliate her sufferings. For three days
 “ and as many nights, every thing taken into her stomach
 “ had been rejected. During this time she had had no
 “ sleep. When Dr. Thornton entered the room she had been
 “ just convulsed, was speechless, and gasping for breath.
 “ Her eyes were fixed and sunk, and surrounded with a
 “ circle of a darkish colour. The muscles of the face still
 “ quivered. He immediately opened the window, for the
 “ room had but one, and ordered the fire to be put out.
 “ The room was then darkened, and filled with fine sprays
 “ of *vinegar*, which, by absorbing the heat of the room,
 “ cooled the chamber, and became aeriform, when, to the
 “ great surprise and satisfaction of the persons who were
 “ present, she revived, and her speech, after a few minutes,
 “ returned to her. As she seemed exhausted for want of
 “ food, Dr. Thornton ordered her the white of an egg,
 “ which, of all nutritious substances, he judged the least
 “ subject to putrefaction, mixing it with white wine, warm
 “ water, cinnamon, and *lemon juice*; he gave her very
 “ small quantities at a time, and finding it remained,
 “ he soon after tried bark and red wine, which was im-
 “ pregnated with FIXED AIR, directing the same man-

“ ner of administration, namely, to stop whenever the
 “ smallest inclination to vomiting came on. She had
 “ water impregnated with FIXED AIR to drink, and was
 “ recovering fast under this treatment, when some offi-
 “ cious ignorant nurse interfered, and the fire was renewed
 “ in the apartment, and the child was loaded with flan-
 “ nels, in consequence of which she was again seized
 “ with similar convulsions, and became speechless; but
 “ in less than five minutes she was restored as before, by
 “ breathing a *superoxygenated air*. In the course of a few
 “ days, from the evacuant, antiseptic, and tonic treatment,
 “ she was out of danger, and able to leave her bed.”

In Dr. Beddoes' Considerations of the Medicinal Power of Factitious Air*, we have the following communication from Dr. Thornton, in a letter to that patriotic physician.

“ DEAR SIR,

“ It seems reserved for the honour of the present enlightened age, to discover a scientific and successful method of treating putrid fever. The contagion has been represented as a stimulus exhausting the irritability of the system, which depends upon the *oxygen* in the blood; and a method of cure, hypothetically deduced, was to supply *this* as fast as it was *consumed* by the *excessive and morbid stimulus*. You justly reprobate the common practice of drenching patients labouring under typhus, with wine and opiates, until they are not unfrequently stimulated to death. ‘ If I have imputed the debility,’ you say, ‘ to its real cause, our chief aim should be to restore *the principle of excitability*; and stimulants should, in the mean time, be exhibited with a more sparing hand.’ Under this per-

* See Part IV. and V. of this interesting work.

suation I have conducted my practice, and with what success the present case will disclose.

“ John Lewis, chairman, living at No. 42, Compton-street, was seized with head-ach; rigors, terminating in violent sweat; great thirst; a very unpleasant taste in his mouth; delirium at night; a sense of burning in the region of the stomach; spirits exceedingly depressed; so weak as to feel his legs sink under him; his countenance was extremely vacant; his answers were incoherent; he complained of incipient deafness; being desired to put out his tongue, it appeared coated, and very brown; and there was a crackling noise in respiration; the pulse was feeble, tense, and very quick. In order to diminish the excitement, I directed an emetic, to be succeeded by a cathartic. The former was repeated twice; the latter every night.

“ To impart *oxygen* to the blood, which was consuming by the excess of morbid stimulus, I made him inhale each day ten quarts of vital air to thirty of atmospheric; and besides *oxyd* emetics and aperients, I gave him *nitre*; adding a little bark and myrrh to keep up his strength.

“ From my journal it appears, that he progressively grew better, and in a fortnight was restored; when, by my advice, he went into the country. In another case I combined the *acetum nitrosum* (nitrous acid) with the happiest effect.

“ I am, &c.

“ R. J. THORNTON.”

In the Philosophical Magazine we have also the following interesting cases:

“ After attending a family labouring under putrid fever, I was seized myself,” says Dr. Thornton, “ with the same

fever, but it was prevented forming by an emetic and calomel cathartic. It assailed next my wife, who being advanced in pregnancy, the same remedies could not be employed, and the fever actually formed itself. The symptoms became so alarming, that mustard cataplasms were applied to the feet, and there arising, towards the close of the disease, violent startings of the tendons, and a cold clammy sweat, with a fluttering and sunk pulse, I was induced to make trial of the *oxygen air* nearly in a pure state, and Mrs. Thornton was immediately *revived* by this remedy, and after a fever, which lasted one and twenty days, recovered. A servant in the house, and a nurse, were next seized, and I had the maid taken out of bed, and made her inhale thirty quarts of vital air, mixed with twice that quantity of atmospheric, which being repeated for a few days, she was completely *restored*. The nurse went home and died of this fever. My two children were afterwards seized with the same fever, and being declared by the gentleman who attended them, past all hopes, I ordered a carriage to be procured, and took them immediately to the top of Highgate Hill, where they were composed to sleep by the keen country air, and came home greatly mended, which excursion being repeated daily, they both recovered, to the surprise of every one. Seeing the good effects of *air*, and of the factitious *oxygen air*, I adopted both in the fullest manner in the instance about to be recorded, the result of which the reader will see from the following letter from an eminent surgeon:—

To Dr. Thornton.

“ Barnet, June 11, 1799.

“ DEAR SIR,

“ My daughter was taken, the 27th of February, 1798, with chills, followed by shiverings, considerable loss of

strength and depression of spirits. She continued suffering much from chills for about four or five hours, after which she complained of heat and flushing in her face, not attended with much thirst, and was a little delirious that night. The next day the symptoms increased, and the debility was so great, that I was obliged, after the first passages had been thoroughly cleansed, to have recourse to wine and bottled porter, together with cordial antiseptic medicines, which plan was pursued under a physician during the progress of the disease; towards the close of which the poor child was so shockingly debilitated, that we expected every minute would be her last, which induced you to direct *vital air*,* by which, and the constant use of strong vinegar thoroughly sprayed with a hearth-brush all over the room and curtains of the bed, revived her astonishingly; but the manner in which she constantly revived, after inhaling the *vital air*, must be chiefly attributed to it, as the vinegar had been used in the way before-mentioned almost from the very beginning of the disease, and was, I believe, not only of great use to the patient, but prevented the fever spreading in my family. No poor human being, I believe, ever had a narrower escape from death, and I shall always feel myself under the highest obligations possible to you for your attention and extraordinary skill in restoring my dear child, with God's assistance, to,

“ Dear Sir,

“ Your much obliged and faithful servant,

“ JOHN CORPE.

“ P.S. I had almost forgot to observe, that the door and windows of my dear child's room were kept almost

* Sixteen quarts of vital air, mixed with the same quantity of atmospheric air, were administered in the evening.

constantly open, and being exactly opposite to each other, naturally created a free circulation of fresh air."

Observations on this case by Dr. Thornton.—"This patient, when I saw her, was convulsed, and the nurse said, 'That if it was her child, nothing more should be given.' Even her mother requested, 'If there really was no hopes, that she might not be disturbed by medicine.' What increased the alarm was, a tradesman, a few doors off, had lately died of this same fever, under two eminent physicians, leaving behind a widow and six children. The case, indeed, seemed deplorable, but despair should never be allowed while there is life, and it authorised the exhibition of the vital air, which, undoubtedly, contributed much to the recovery of this amiable young lady."

We shall not detain the reader with any fuller detail concerning putrid fever, as the subject will be again resumed,* but shall hasten briefly to relate the new trials which have been lately made in *scurvy*. From the resemblance of the blood taken from the arm with that of a person labouring under a putrid fever (for the blood does not, or very feebly coagulates), from the sallowness of the countenance,—the black and blue spots suffused over the surface,—the coldness of the body, &c. the illustrious Dr. BEDDOES first conjectured that in *scurvy* there was a deficiency of OXYGEN in the blood, and suggested a plan of treatment according to this theory.† Soon after,

* We shall then do justice to the discovery of Sir William Fordyce, and relate the extraordinary recovery of the son of Lord Bute, by means of the MURIATIC ACID; and we shall then likewise consider the practice of Dr. James, and enter fully into the merits of his justly celebrated powder.

† Vide *Observations on the Nature and Cure of Calculus, Sea Scurvy, Consumption, Catarrh, and Fever*; by Thomas Beddoes, M.D.

a practical treatise* appeared, written by Dr. TROTTER. "It is our duty," says this learned and humane physician, "to draw philosophy from the laboratory of the chemist, and make her subservient to the practical purposes of life. Whilst I had the advantage of collecting facts on the subject of scurvy, Dr. BEDDOES had superior advantages to me, in improving and extending the doctrine which I had adopted. A situation infinitely more favourable to philosophical retirement, a knowledge of chemistry inferior to none in our age, a love for the study, and a desire to reduce it in practice, to the relief of his fellow-creatures, have brought us to an era in the history of medicine, that has unfolded to our view, secrets of nature, on which our predecessors in science were not even able to form a plausible conjecture. In February 1793, I was removed," says Dr. TROTTER, "from the Centurion to the Vengeance of 74 guns, then at Spithead, and fitting to receive the broad pendant of Commodore Charles Thomson, now Rear-Admiral; and intended for the Leeward Island station. The work† of Dr. BEDDOES was at this time put into my hands. The company of the Vengeance had a quart of cocoa a man, with sugar enough to sweeten it, for breakfast, in lieu of oatmeal, butter, and cheese.— They had for dinner excellent salt meat. Yet scurvy was not prevented from making its inroad. The officers of this ship, who at first had always plentifully shared

* *Medical and Chemical Essays: containing observations on scurvy; communications from South Wales; the case of a blue boy; and thoughts on the chemical nature and decomposition of water, with a certain method of preserving it pure and sweet in long voyages.* By Thomas Trotter, M.D. physician to his Majesty's fleet under the command of Admiral Richard Earl Howe.

† Observations on Calculus, Sea Scurvy, &c.

“ their fresh stock with the sick, could in the present
 “ instance afford them no assistance, for they had but a
 “ very small store on board, not sufficient to last them a
 “ third of the present voyage. Many persons were in
 “ consequence violently afflicted with sea-scurvy.

“ Robert Bell, aged thirty, was a seaman, and im-
 “ pressed: his symptoms of scurvy were spungy gums,
 “ hardened and contracted hams, livid spots on the thighs
 “ and legs, very much depressed in spirits, and apprehen-
 “ sive. He was ordered vitriolic acid diluted in water,
 “ in as great a quantity as his stomach and bowels would
 “ bear without pain. For the first two or three days Bell
 “ had better spirits, and looked more lively; but the
 “ benefit did not continue, for he grew much worse at
 “ the end of a week. It was then changed for juice of
 “ LIMES, which in a few days effectually cured him. The
 “ effect of LIME JUICE, as I have had many occasions
 “ since to observe, was apparent always in less than
 “ twenty-four hours. Five cases of nearly the same de-
 “ scription followed the above; and the result was uni-
 “ formly the same. In the fond attachment to the phi-
 “ losophy of physic, and the enthusiasm of scientific en-
 “ quiry, one may be sometimes betrayed into fallacious
 “ conclusions. But divesting myself of all partiality for a
 “ favourite opinion, I can have no doubt,” continues Dr.
 Trotter, “ that the good effects of the CITRIC ACID in the
 “ cure of *scurvy*, are entirely owing to its imparting
 “ OXYGEN to the blood, however difficult it is to re-
 “ concile it with the want of efficacy in the other acid in
 “ curing this disease.

“ In December 1793, I was appointed physician to the
 “ royal hospital at Haslar, Portsmouth. This hospital
 “ is attended by two physicians. The south side fell to
 “ the lot of Dr. John Lind, and the north to me. The

“ first patient in scurvy who came under my care was
 “ John Driver, belonging to the Queen Charlotte, the
 “ flag-ship of Earl Howe. His symptoms were invete-
 “ rate, and the hams so contracted that he could not
 “ walk. He was by the assistant dispenser put on the
 “ *vinum antiscorbuticum* of the hospital, the same as pre-
 “ scribed by Lind, senior. At the time I visited him, he
 “ had taken his medicine for two days, and was on a diet
 “ of mutton and greens; yet he found himself worse.
 “ He was immediately ordered two ounces of the CITRIC
 “ ACID three times a day. On calling to see him next
 “ morning, I found him still worse, and ordered him two
 “ ounces of the same acid four times a day. On the day
 “ following I was yet more surprised, that his complaints
 “ were not beginning to yield. He was now yellow or
 “ livid all over, and his pains at night tormenting. The
 “ nurse, and other people in the ward, assured me, that
 “ his medicine was faithfully taken. From this I was led
 “ to examine the bottle at the head of his bed, where,
 “ instead of *lime juice*, it was the *diluted sulphuric acid*.
 “ There were, it appeared, no lime juice in the dispensary,
 “ and the *succedaneum* had nearly cost the man his life.
 “ I now supplied him with sixteen ounces of the CITRIC
 “ ACID, concentrated by congelation. With this prepara-
 “ tion he recovered in a few days; and was soon after
 “ discharged to his ship.”

“ While a surgeon in the royal navy, I have, oftener
 “ than once, had occasion*,” says Mr. Patterson, “ to
 “ lament the limited power of medicine, and in no parti-

* Vide *A Treatise on the Scurvy; containing a new, easy, and effectual
 method of curing that disease; the cause, and indications of cure, deduced
 from practice; and observations connected with the subject; with an Appen-
 dix consisting of five letters, respecting the success of a new antiscorbutic
 medicine.* By Mr. Patterson, Surgeon in the Royal Navy.

“ cular instance more than in scurvy. In various stations,
 “ and in opposite climates, I have had frequent opportunity of observing this disease, in all its variety; and, at
 “ times, obliged to witness it, in all its hideous shapes,
 “ without having it in my power to put a stop to its
 “ destructive career. Such scenes as these are well calculated to make a medical man attentive. I could not
 “ fail to observe the great desire that scorbutic patients
 “ have for *acids*. People, labouring under this disease,
 “ have been known to use, in the way of drink, and in
 “ seasoning their food, one pint of vinegar in the course of
 “ the day, and with impunity. One patient drank, during
 “ a night, a whole quart, without any painful or disagreeable
 “ symptoms supervening. Having seen the good effects
 “ of *nitre* (nitrous acid combined with alkali) in several
 “ cases of scurvy, and knowing, from the discovery in chemistry, that it contained a vast quantity of the *acidifying*
 “ *principle*, or VITAL AIR, I was led to make a solution
 “ of this salt in *vinegar*. Before I administered this new
 “ remedy, I made the following experiments out of the
 “ body. I took the blood from a patient in scurvy, and
 “ from a man in health, and having cut off the florid surface of the coagulum, I poured some diluted *vitriolic*
 “ *acid* on the dark coloured coagulum, and it assumed a
 “ *black* appearance in both cups. On the contrary,
 “ when I poured this solution of *nitre* in *vinegar*, the
 “ colour of the coagulum was immediately changed to a
 “ beautiful *red*, more bright than even arterial blood, it
 “ even turned to a bright *red* that dark coagulum which
 “ the diluted vitriolic acid had nearly rendered black.
 “ Upon the first favourable occasion, I was resolved to
 “ try this solution, and I had soon occasion to put it to the
 “ test of experiment; and with inexpressible pleasure I
 “ found it, in a vast variety of cases, succeed beyond my

“ most sanguine expectation. By means of the *nitrous*
 “ *vinegar*, the belly, in general, is kept gently lax; the
 “ discharge of urine is increased, and changes from an
 “ alkaline to a healthy nature; the skin becomes open,
 “ and more agreeable to the touch; the chilliness is
 “ changed to a pleasing warmth; and the pulse acquires
 “ steadiness and healthy strength. Sleep comes to be
 “ more natural. The sallow and the gloomy countenance
 “ is gradually changed into the cheerful. The gums heal
 “ and grow firm. The lower extremities lose faster than
 “ could be supposed their livid hue; they gradually be-
 “ come softer, less painful, and more flexible; and ulcers
 “ put on an healthy appearance, and soon skin over. The
 “ great oppression about the breast gives way; and the
 “ cough and breathing become less laborious. The appe-
 “ tite and the sense of taste is restored. The depression of
 “ spirits and the lassitude are forgot. The strength increases;
 “ and, at last, health is re-established. In the month of
 “ July, 1794, I made comparative trials with this solution,
 “ and the juice of *limes*, and after having duly weighed
 “ all circumstances, I am inclined to decide in favour of the
 “ former; one advantage, however, it certainly possesses
 “ over the latter, as it consists of articles which may at all
 “ times, and with very little expence, be obtained, and
 “ without difficulty preserved; in short, it is the *desidera-*
 “ *tum* which Dr. Beddoes has attempted to establish.”

We are now arrived at the most brilliant æra in physíc.
 The different factitious airs were soon after tried at the
 Hotel Dieu in Paris, many of which proved successful, but
 some turning out inauspicious,* and the revolution suc-
 ceeding, with the tyranny of Robespierre, who put to
 death Lavoisier, and many other literary characters, a veil
 was drawn over this new branch of science for a time, but

* The trial of vital air in consumption.

as Fourcroy justly observes, “ the analogy of action which
 “ has been discovered between digestion, respiration,
 “ circulation, and insensible perspiration, has begun to
 “ establish on new views, more solid than were heretofore
 “ possessed, a system of ANIMAL PHYSICS, which pro-
 “ mise an abundant harvest of discoveries and improve-
 “ ments. Unquestionably it will be, in pursuing the
 “ chemical changes that are undergone in the system,
 “ that an EDIFICE equally *novel* and *solid* will be erected.”

Whilst the progress of the pneumatic practice of physic was stopped in France by the revolution, Dr. Beddoes, the celebrated professor of chemistry at Oxford, endeavoured to turn the attention of the faculty in *England*, to this new branch of science. He settled at Bristol Hot Wells, with a view of curing consumption by a *reduced atmosphere*; and the abstraction of *oxygen* from the system. His works soon passed into the hands of every one; for he possessed the rare art of diffusing through his writings that lively interest, that enchanting colouring, and that delicate and vigorous touch, which influence, attach, and subdue the mind. The profundity of his reasoning is every where united to all that agreeable imagery, which the most brilliant imagination can furnish. The sacred fire of genius animates all his productions; his theories constantly exhibit the most sublime prospects in their totality, and the most perfect correspondence in their parts; and even whilst he raises *hypotheses*, we are inclined to persuade ourselves that they are established truths.

Unfortunately for the establishment of *pneumatic* remedies, *consumption*, is not a disease often cured, and few other diseases are seen at the Hot Wells. The *vital air* was tried for the same disease, in the Hotel Dieu, in France, and, as Chaptal elegantly expresses himself, “ it

spread flowers on the borders of the tombs, but it hastened the catastrophe," and hence no farther trials were made in that kingdom.

The celebrated Dr. DARWIN, who has of late turned his attention much to this subject, observes, " that
 " VITAL AIR penetrates the fine moist membranes of
 " the air-vessels of the lungs, and unites with the blood
 " by chemical attraction, as is seen to happen, when
 " blood is drawn into a basin, for the lower surface of the
 " crassimentum is of a dark red so long as it is covered
 " from the air by the upper surface, but becomes florid
 " in a short time on its being exposed to the atmosphere.
 " The perpetual necessity of the mixture of VITAL
 " AIR with the blood in the lungs, evinces that it must
 " act as a stimulus to the sanguiferous system, as the
 " motions of the heart and arteries presently cease, where
 " animals are immersed in air which possess no oxygen."
 It may also subsequently answer another important purpose, as it probably affords the *material* for the production of the *sensorial power*, which is supposed to be secreted in the brain and medullary part of the nerves; and that the perpetual demand of this fluid in respiration is occasioned by the *sensorial power*, which is supposed to be produced from it, being too subtle to be confined in any part of the system.*

The Rev. Mr. TOWNSEND, the learned author of *The Elements of Therapeutics*, observes, when speaking of the FACITIOUS AIRS, " that these promise, under the skilful
 " management of Dr. BEDDOES at the Hot Wells, Bristol,
 " and Dr. THORNTON in London, to be a remedy well
 " worthy the attention of the medical practitioner. The
 " VITAL AIR, properly diluted with common air, is a

* Vide *Zoonomia, or the Laws of Organic Life*, vol. ii. A work which occupied, as this philosopher says, thirty years deep meditation.

“ stimulus the most natural and diffusive. It promotes
 “ the insensible perspiration, greatly aids digestion, fa-
 “ vours sleep, exhilarates the spirits, and relieves difficult
 “ respiration. It is found of the highest advantage in
 “ most nervous diseases. The AZOTIC AIR abates
 “ inflammation, and is the only remedy with the HY-
 “ DROGEN AIR, that is found capable of arresting the
 “ progress of consumption, and the CARBONIC ACID
 “ AIR is a most powerful antiseptic.”

It being ascertained by direct experiment, that the heart and arteries can be *raised** from 64 to 120 pulsations in a minute, by the inhalation of pure OXYGEN, OR VITAL, AIR, and that by abstracting this VITAL GAS from atmospheric air, their actions can be *lessened*† from 120 to 64 beats in a minute, the PNEUMATO-CHEMICAL *physician* has therefore a complete power over the heart and arteries, just as a *watch-maker* has a power over the movement of a watch, by means of the regulator.

It being likewise proved, that the blood and solids are composed in part of VITAL AIR, he has also the power of altering the *mass of blood*, and therefore of changing the

* Although Mr. Taylor was not more than 22 years of age, his natural pulse was only 64 previous to the experiment. During the inhalation of the pure OXYGEN air, his pulse, as Dr. Higgins remarked, was quickened to 90 beats in a minute, and was considerably increased in *fulness* and *strength*. The vessel being immediately charged again with 19 pints of OXYGEN GAS, he respired these also, and consumed them entirely in six minutes. His pulse was in consequence increased to 120 beats in a minute, and was *vigorous withal*. See *Minutes of the Society for Philosophical Experiments*, p. 146. Also Dr. Goodwin's *Experiment*, p. 79, and note*, p. 110.

† One consumptive patient, contrary to my judgment, says Dr. Beddoes, used to inhale at times air wholly deprived of *oxygen*. During this process I have felt the pulse nearly *obliterated*. He loved to indulge in it, and describes the incipient insensibility produced on him as a state highly delightful. Vide Dr. Beddoes's *Observations*, p. 30.

constitution. He possesses in the **VITAL AIR** a means of promoting the *insensible perspiration*, quickening the *digestion*, increasing the *animal heat* and *muscular powers*, and of raising the *spirits*.

Dr. Thornton, at the same time as Dr. Beddoes, began the employment of the factitious airs in his practice of physic, and, with a becoming ardour, has pursued the subject with much advantage to the public. He now stands at the head of this improvement since the death of Dr. Beddoes, and despises the opposition that naturally arises from any new improvements in physic.

Attention is undoubtedly not less due to the **OTHER AERIAL ELEMENTS**; and if the importance of **OXYGEN** seems to have been chiefly insisted on in the foregoing observations, it is only because we have very few facts which afford a foundation for reasoning concerning the connection of an excess or deficiency of **CARBON**, **HYDROGEN**, or **AZOT**, with the functions of life; and yet much obscurity and many difficulties must be expected to remain, till we acquire the knowledge of such facts. Let us, however, set a due value on our present knowledge, though it be imperfect; and restrain those rude hands that are ever ready to pluck up the tender plants of science, because they do not bear *ripe fruit* at a season when they can only be putting forth their *blossoms*.

* For cases in which the factitious airs have been inhaled, vide the end of this volume.

SECT. I.

Of Asphyxia from Unrespirable Airs.

WE are arrived at that part of the subject, which is of the greatest importance, the *diseases* incident to the human frame, and the philosophic *methods* of *cures*. In the first volume we saw how the animal frame was actuated by stimuli, and *health* was produced; and in this we shall contemplate another LAW of the animal economy, how a *defective stimulation produces either weakness, or accumulates irritability, in the moving and sentient fibres*.

When an animal is immersed in water, his pulse becomes weak and frequent; he feels an anxiety about his breast, and struggles to relieve it; in these struggles he rises towards the surface of the water, and throws out a quantity of air from the lungs. After this his anxiety increases, his pulse becomes weaker; the struggles are renewed with more violence; he rises towards the surface again; throws out more air from his lungs, and makes several efforts to inspire; and in some of these efforts, a quantity of water commonly passes into his mouth; his *skin* then becomes *blue*, particularly about the *face* and *lips*; his *pulse* gradually *ceases*; the *sphincters* are relaxed, and he falls down *without sensation, and without motion*.

This description of *drowning* applies, as far as the circumstances admit of comparison, to the *effects* occasioned by *unrespirable airs*. I have had occasion, says Dr. Beddoes, to remark them in a number of persons, who were curious to try how long they could breathe HYDROGEN GAS. The *frequency* and *debility* of the *pulse*; the *blue-*

ness of the *lips* and *coloured parts* of the skin, were very observable in a minute or a minute and a half. Besides, *dizziness* was felt, and the *eyes* have grown *dim*; in animals, the transparent cornea has appeared sunk and shrivelled, the skin has become flaccid, and the body was as it were collapsed. Several individuals agree in describing the incipient insensibility produced by the hydrogen air as highly agreeable. During this process, I have felt the *pulse* nearly *obliterated*. Afterwards, as the persons have recovered, it becomes sensibly *fuller* and *stronger* than before the inspiration. This fact, continues Dr. Beddoes, belongs to a general principle now beginning to be understood; "WHEN THE
" ORDINARY POWERS HAVE BEEN, FOR A SHORT TIME,
" WITHHELD FROM THE BODY, THEY ACT AFTERWARDS
" WITH GREATER EFFECT," as holding the fingers to the *fire* after handling *snow* occasions severe aching.

In a late publication*, says that ingenious physician, we find many experiments, which confirm the opinion here advanced, that the unrespirable airs destroy by disarming the system of its moving principle, yet do they, at the same time, tend to refute the idea of those who have supposed that they produce this deleterious effect *solely* by the exclusion of the oxygen of the atmosphere. Between these airs there seems a remarkable difference in their power to produce insensibility and death. Hydrogen, or inflammable air, appears the least noxious, both when inspired alone, or mixed with atmospheric air. Azote comes next; then fixed air; and the hydrocarbonate appears extremely active, and I presume, adds Dr. Beddoes, that for recovery from asphyxia in water (when but little goes down the wind-pipe†) or hydrogen air and azote will be much more

* *Considerations on the Medicinal Use of Factitious Air, &c.*

† As the intention of this work is to set forth TRUTH, and not to combat erroneous opinions, the reader will not be surprised to find this question,

easy, than from asphyxia occasioned by other unrespirable mediums. It may be reasonably conjectured, that fixed air, and hydrocarbonate, act by *combining* with the *oxygen* already in the blood, as well as by its *excluding this principle*: and this conjecture is supported by the hydracarbonate possessing a much less effect, when it has deposited some part of its charcoal; as also from the alteration which it is found to produce upon the blood*.

“ Whether the introduction of water into the wind-pipe is, or is not, the “ immediate cause of death in drowning ? ” as mentioned by DeHaen, and others, wholly overlooked in the Section professedly treating on the recovery of drowned persons. We will, however, consider it for a few moments in this place. If an artificial *dropsy of the chest* be produced by injecting two ounces of water into the lungs, through the wind-pipe of a healthy animal, it immediately causes oppression and difficulty of breathing, but no fatal asphyxia ensues: but the water is gradually absorbed, and the symptoms soon disappear. In drowning, the case is very different, since a few minutes submersion is sufficient to destroy the life of the animal, even whether water enter the wind-pipe or not, for, in most cases, none is found in the lungs after death. This is decisively proved by the justly celebrated Dr. Goodwin. He placed animals in quicksilver and in ink, and so little of this weighty metal, or coloured fluid, was found in the lungs, as left no doubt of it not being the proximate cause of drowning. In one experiment after expiration, the animal was drowned in ink, and no fluid whatever was found in the lungs. Vide Dr. Goodwin’s *Essay on Life as connected with Respiration*, to which was adjudged the gold medal.

PROPTER *optimam* DISSERTATIONEM DE RESUSCITATIONE.

* “ Having,” says this ingenious experimentalist, “ put two fowls, the one in *fixed air*, and the other in *hydrocarbonate*; to my great surprise, I found in the *former* the same appearances as in drowned or strangled animals, only the liver appeared a shade paler. But in the *latter* the whole flesh was throughout of a *light pink* colour, when boiled, and the marrow of a *fine red*. The *former* tasted nearly as usual, the *latter* was certainly much more tender.” Other acids, beside the carbonic acid, produce the same change on *venal blood*, rendering it of the *arterial colour*. The *hydrocarbonate air* is the happy discovery of the ingenious Mr. Watt, one of the first chemists of the age.

Mines and coal-pits are frequently infested with two species of noxious air. The first is termed by the miners *Choke-damp*, which is fixed air, which being specifically heavier than atmospheric air, occupies the bottom of the mine. The other is called the *Fire-damp*, which is inflammable air, and being ten times lighter than common air, ascends to the upper region of the mine. The former is probably formed from the *charry matter* in the bowels of the earth, the latter from a fine *aqueous exhalation*, and spontaneous *decomposition*. But *here* we are to consider the *manner* in which *these evils are to be remedied*, rather than the mystery of *their formation*.

To obviate the *fire-damp*, miners are in the habit of crawling on their hands and feet, and with a taper affixed to a long stick, set fire to the inflammable air*, which sometimes goes off with a terrible and sometimes fatal explosion.

With respect to the *choke-damp*, no means has yet been devised but *ventilation*, it being supposed to be stagnated air. However, as to the mode of *ventilation*, and the *correction of this species of air*, we will offer a few hints.

A *shaft*†, as it is called, should be carried down some-

* Some years back a scheme was projected at Whitehaven to light up that town by means of the *inflammable air* in the pits, which was to be conveyed by pipes throughout every street. As chemistry advances, may not the water of the Thames be *decomposed* in certain appropriated places, and the *inflammable air* conveyed throughout the Strand and City, and this part of the town be *splendidly illuminated* each night at a very moderate expense!—Since the discovery of the nature of *combustion*, and the constituent principles of water, it is hoped that the candid reader will not consider this hypothesis as a mere rhapsody. Were a person to survey London now illuminated as it is by *Argent's lamps*, and the product of the *Greenland fisheries*, and compare it with what it was *five hundred years back*, he will perhaps feel inclined to extend his views on the prospect of *future improvements*!

† It is pleasing to observe the knowledge which our ancestors had of the

what slanting, and the funnel conveyed to the bottom of the pit, whereby the heavier and purer air from above would descend; while a perpendicular shaft, or chimney, with its mouth arising from the top, would carry up the lighter and corrupted air, together with the inflammable.

Should *fixed air*, notwithstanding this, stagnate in some parts of the pit, an engine, such as they water gardens with, should be used to *absorb* the *fixed air*, or else water

nature of air. Ray, in a work, entitled *The Wisdom of God manifested in the Works of Creation*, written in the last century, says, p. 73, in speaking of *air shafts*, "Indeed, were there no damps in mines, yet the *nitrous part*," (the NITROGEN, or OXYGEN, as it is now called) "of the air being spent and consumed by the breathing of the miners, the *remaining part*" (the AZOTIC) "would be unfit for respiration, unless new and fresh air were to succeed."—In another place he says, p. 72, "The air is the fuel of the VITAL FLAME, without which it would speedily languish and go out."—Again, he says, p. 73, "*Fishes*, and other *water animals*, cannot support life without it, for if you put your hand, or any cover over a vessel containing fish, so as wholly to exclude the air, they will be suddenly suffocated."—Again, p. 74, "Neither is it less necessary to *insects*, for if you put oil upon them, so as to obstruct those orifices that draw in air, if you obstruct only some, the parts that are supplied with air from them are shortly deprived of MOTION, while the rest of the parts that are untouched retain it."—Again, p. 75, he says, "I am persuaded, with my learned friend, Dr. Hulse, that the chief use of the circulation of the blood, through the cotyledons of a calf in the womb (which I have often dissected), and by analogy, through the *placenta uterina*, seems to be the IMPREGNATION OF THE BLOOD WITH AIR," (he has above explained the species of air) "for the feeding the *vital flame*: for if it were only for nutrition, what need of two such great arteries to convey the blood thither? Secondly, I have observed the *umbilical vessels* to terminate in a multitude of PAPILLÆ. Now these PAPILLÆ do resemble the RADII of a FISH'S GILLS, and most probably have the same use, viz. TO SECRETE AIR, and convey it to the fœtus, so that the fœtus in the womb doth resemble a fish in its mode of living, or else why should there be such an instant necessity of *respiration* so soon as the fœtus is fallen off from the womb?" Ray acknowledges reading the works of Hook, whom he greatly compliments, but never once mentions Mayow.

should be kept continually boiling; for as the steam condenses, it would become *impregnated* with the *fixed air*. This ought constantly to be observed, where *charcoal fires* are employed. A tea-kettle boiling by the side would obviate the chief, if not the whole, of the evil.

In the *Hist. de l'Academie des Sciences*, Anno 1710, we are told of a baker at *Chartres*, going along with his son, a robust young man, into a cellar 36 stairs deep, who followed him with a candle, the candle went out on the middle of the stairs. Having lighted it afresh, he was no sooner got into the cellar, than he cried out for help, and they heard no more of the son or father. His brother, an able youth, ran immediately after him, cried out he was dying, and was heard no more. He was followed by his wife, and she by a maid, and still it was the same. Such an accident struck the whole neighbourhood with a panic, and no one was forward to venture any farther, till a fellow, more hardy and zealous than the rest, persuaded that the five people were not dead, would go down to give them help. He cried too, and was heard no more. Upon this, a *sixth man*, taking with him a hook, drew the last of them forth, without going to the bottom, who, fetching a deep sigh, died. Next day the baker's friend, undertaking to get up all the carcasses with the hook, was let down with ropes. He called out, and in the haste the rope breaking, he fell into the cellar, and was dead. The magistrates taking cognizance of the case, the physicians were consulted, who advised a good deal of *water* to be thrown down. This being performed, a dog and a lighted candle were let down without injury to either, and the dead bodies in this cellar were taken out.

Lime-kilns throw off large quantities of *fixed air*; and those who incautiously lay themselves down either on the walls of the kiln, or so near as to be exposed to the

vapour which rises from the burning lime-stone, often experience its pernicious effects. Some years ago, I remember a poor family, says Dr. Falconer, of Bath, who lodged in a room adjoining to a lime-kiln; during the night the vapour of the burning lime made its way into the room, and the four persons, of which the family consisted, were all killed. In the morning they were found lying as in a composed sleep, without any appearance of having gone through either pain or struggle.

In the spring of the year 1778, two disorderly young women, after rambling about the town for a considerable part of the night, crept early in the morning into a little hovel which was contiguous to a lime-kiln. The kiln was charged and burning, and the vapour of the lime was forced through some crevices into the hovel. After some hours, the man who had the care of the kiln came to look after his work, and finding these women, as he supposed, asleep, went away without disturbing them. Some time after he returned, and seeing them still in the same place, endeavoured to awaken them, but in vain; they were cold and motionless. In one there did not appear to be the least remains of life; and in the other there was only a slight and indistinct movement about the heart. This patient was soon conveyed to the hospital. By proper means she was recovered, and ran away from the hospital, without expressing the least sense of gratitude for the care and humanity which had been exercised towards her. The other was not conveyed to the hospital so early, and the same means were used, but without success.

There is a small *grotto* at the foot of a little hill*, about 8 feet high, 12 long, and 6 broad; from the ground there arises a thin subtle fume, visible enough to a discerning eye, which does not spring up in little parcels here and

* Called *Grotto del Cani*.

there, but is one continued stream, covering the whole surface of the bottom of the cave; and has this remarkable difference from common vapours, that it does not, like smoke, disperse itself into the air but quickly after its rise falls back again, and returns to the earth; the colour of the sides of the *grotto* being the measure of its ascent, for so far it is of a darkish green, and higher, only common earth, and therefore we find no inconvenience by standing in it; and so no animal, if its head be kept above this mark, is in the least injured. But when a dog, or any other creature, is forcibly held below it, or by reason of its smallness cannot hold its head above it, it presently, like one stunned loses all motion, falls down as dead, or in a swoon, the limbs are convulsed and trembling, till at last no more signs of life appear than a weak and almost insensible beating of the heart and arteries, which, if the animal be left there a little longer, quickly ceases too, and then the case is irrecoverable; but if snatched out, and laid in the open air, it soon comes to life again, and sooner yet if thrown into the *adjacent lake*.

The *Russians* and *Germans* are frequently exposed, during their cold season from the *noxious air* of their stoves, and want of due ventilations. As soon as a person with them is discovered to be deprived of sense and motion, he is stripped naked, and brought into the *open air*, where he is rubbed with *snow*, or *cold water* is dashed repeatedly over the surface of his body.

To attempt to restore *lost heat*, by the application of cold water, or snow, must appear preposterous folly to those who have long been in the habit of applying *artificial heat*; whether the sufferer is drowned under the thick ice; suffocated by inflammable air; or bleached by the drifted snow.

How can we reconcile this practice in such different

cases to the suggestions of common sense! Shall we, with John Hunter, say, that *cold* is suited to the *feeble* power of life; or, with John Brown, that cold is but the absence of a certain portion of heat, and is therefore a stimulus adapted to the *accumulated irritability* of the fibre. Undoubtedly, the method above stated, is universally practised throughout the north, even with the *common people*, and with *constant success*, where respiration has not been suspended above an hour. This is an *argument crucis*, that all parties must ultimately acquiesce in, however they may choose to *explain* the circumstance.

The fact has otherwise been attempted to be explained. The celebrated Kerr was rendered insensible by the fumes of charcoal. Water was poured over him, when he immediately revived. He supposes that the water was decomposed, and its *oxygen* penetrated the pores, or was absorbed, and stimulated the heart immediately into action. Vide Kerr's Chemical Dictionary, a work, to use the emphatic praise of Dr. Darwin, of such value as to outweigh the consideration of the loss of the Alexandrian library,

SECT. II.

Of Asphyxia from Hanging.

AS hanging and drowning occasion death by preventing the access of air to the lungs, and the expulsion of the effete, and fixed, airs, it may not be improper to introduce these subjects here.

If death was nothing, and *nought* after death;
 If when men dy'd, at once they ceas'd to be,
 Returning to the barren womb of nothing,
 Whence first they sprung—Then might the wretch
 That's weary of the world, and tir'd of life,
 At once give each inquietude the slip,

By stealing out of being when he pleas'd,
 And by what way : whether by *hemp*, or steel.
 Death's thousand doors stand open.—Who could force
 The ill-pleas'd guest to sit out his full time,
 Or blame him if he goes?—Sure he does well
 That helps himself as timely as he can,
 When able.—But if there's an *hereafter*,
 And that there is, CONSCIENCE, uninfluenc'd
 And suffer'd to speak out, tells every man ;
 Then must it be an *awful thing* TO DIE :
More horrid yet TO DIE *by one's own hand*.
Self-murder !—dreadful deed !—our island's shame !
 That makes her *the reproach* of neighbouring states,
 Shall NATURE, swerving from her earliest dictate,
Self-preservation, fall by her own act ?
 Forbid it Heaven !—Let not, upon disgust,
 The *shameless hand* be foully crimson'd o'er
 With blood of *its own Lord*.—Dreadful attempt !
 Just *reeking* from *self-slaughter* in a rage
 To *rush into the presence* of OUR JUDGE ;
 As if we challeng'd him to do his worst,
 And heeded not his wrath.—

BLAIR.

From what has been already observed, it seems evident, that whether death is brought on by *submersion*, or *noxious air*, the effects produced on the animal body are so nearly *similar*, that these several modes of death may not improperly be referred to the *same common cause*. But with respect to the effects of *hanging*, most authors have inclined to the side of APOPLEXY, and this is much insisted on by Drs. Cullen and Boerhaave, and of late by Mr. Kite ; and as a *difference in theory* cannot but *influence practice*, it therefore demands the most serious investigation.

It is observable, that in APOPLEXY the irritability continues several hours,—while in *drowning* or *hanging* the animal functions are abolished in a few minutes.

In APOPLEXY, respiration, together with the action of the heart and arteries, go on, and the pulse often vibrates

more forcibly than in health.—In HANGING, or DROWNING, respiration is suppressed, and the pulse obliterated.

In apparent death from APOPLEXY, very few recover, and those few generally become paralytic.—In vital suspension from DROWNING or HANGING, many are restored, and yet no palsy supervenes.

In cases of *apparent death*, an APOPLEXY indeed may sometimes occur, not as a *certain consequence*, but as an *accidental circumstance*. Thus in HANGING, if the person shall leap from an height to accelerate his death, it may produce a dislocation of the vertebræ of the neck, or an extravasation of the brain. Thus in DROWNING, if the person shall have fallen from any height, and receive a contusion on the head, and yet after all life be restored, it is no wonder, if PALSY supervenes, a circumstance, however, by no means frequent in other cases of restoration from apparent death.

In a word, the TWO CASES, upon the first view of things, appear to be *totally different*, and to require a *very different mode of treatment*.

In the *latter*, copious bleeding affords the principal relief; in the *former* it generally proves highly injurious.*

The *wind-pipe* of a dog, says a very acute and ingenious experimentalist, Mr. Coleman, was secured by a ligature at the instant of inspiration; in less than *four minutes* he ceased to struggle. Here there was *no obstruction* to the passage of the blood *through the lungs*, and *no accumu-*

* In March, 1781, the MEDICAL COMMITTEE entered their *Caveat* against the use of the lancet.

——— Si Pergama dextra

Defendi possent, etiam hac defensa fuissent.

VIRG.

Vide Mr. Kite's laboured *Essay on the Recovery of Persons apparently drowned*, to which was given the *silver medal*.

PROPTER eruditam DISSERTATIONEM DE RESUSCITATIONE.

lation was found in his *head*; yet he died in this short space of time.

We next secured, says he, the two carotids* of a dog (which we know, from the experiments of Messrs. Emettus and Kite, may be done without materially injuring the functions of the animal). In half an hour after this operation, he was hanged. In less than four minutes he ceased to move. The vessels of the brain, upon accurate inspection, were much *less distended* than in *ordinary death*. Here the principal supply being cut off, instead of the vessels of the brain being in a state of *congestion*, they contained a much *less quantity* of blood, than *natural*, and consequently no species of *APÖPLEXY* could follow *from distention*, and yet this animal died *as soon* as others which had undergone no such operation†.

The following experiment, which was made by that eminent anatomist and teacher at Edinburgh, Professor Munro, is, we think, decisive on this subject.

A dog was suspended by the neck with a cord: an opening having been previously made in the wind-pipe below the cord, so as to admit of air into the lungs. In this state he was allowed to hang three quarters of an hour, during which time the circulation and breathing went on without being much interrupted by the experiment. The cord being now shifted below the opening into the wind-pipe, so as to intercept the ingress of air into the lungs, the animal was completely dead in a few minutes.

Now, admitting these facts, is not the conclusion obvious, viz. *that in cases even of HANGING, death is not occasioned by a CONGESTION OF BLOOD in the brain; but from*

* Examine our Map of the Heart.

† Vide Mr. Coleman's excellent *Dissertation on Suspended Respiration*, a work replete with ingenious experiments, and honoured with the gold medal.

the want of the VITAL PRINCIPLE in the blood derived from the air?

For the Plan of Treatment we must therefore refer the reader to what will be delivered in the Section on the recovery of drowned persons.

SECT. III.

Of the Institution of the Humane Society for the Recovery of Persons apparently dead.

“ Since no one from the prince to the peasant can at all times be secure from those dreadful disasters, which suddenly suspend vital action ; and since medical practitioners themselves are by no means exempt ; it surely becomes them to use every exertion to *improve the art of RESTORING ANIMATION*. May each progressive step, in this interesting path of science, tend to that great object ! And may every laudable attempt, undertaken with that benevolent view, enable us with *more certainty to preserve life, and to diminish the sum of human infelicity.*”

DR. FOTHERGILL.

What transport must it afford every compassionate bosom, to be instrumental in recalling an helpless fellow-creature from an untimely grave ;—to witness, at that critical juncture, the heartfelt passions of anguish and despair, of hope, fear, surprise, and joy, which alternately agitate the human frame ;—to mark the lively traits of gratitude painted in the countenances and deportment of the mother, sisters, brothers, &c. of the restored object !—What epicure could ever yet boast so refined, so exquisite a luxury, as the benevolent deliverer must experience from such a scene :—a scene far beyond what any pen as yet hath been able to describe, or pencil to express.

Previous to the origin of this new branch of healing (which indeed constitutes a *remarkable æra* in the science of physic), death, apparent and absolute, had long been considered as almost synonymous terms. For the subjects of both appear to have been alike consigned to the silent man-

sions of the tomb, without its being ever dreamt that such a vast proportion of the former might, by a few simple means, have been recalled to life, and all the endearments of social happiness.

Of the truth of this important fact, the Transactions of the HUMANE SOCIETY have afforded the most ample demonstration. Little did any man think, not even the founders of this Society themselves, inflamed as they were with sacred zeal, that, in the year 1794, there should be recorded 3000 instances, wherein the Society's aid had been extended, TWO THIRDS of which had proved successful.

No sooner had the HUMANE SOCIETY surmounted the first difficulties inseparable from a novel undertaking, than it not only fixed the attention of the medical faculty, but also attracted the notice of the poet, the painter, the philosopher, and the divine. By such collateral aid, but still more by the uncommon exertions of ONE INDIVIDUAL, has this institution at length happily *silenced* all objections, *triumphed* over prejudice, and *diffused* its benefits over a considerable part of the known world.*

* “Gentlemen, says Dr. Lettsom, (addressing himself to the Members of the *Humane Society*, assembled together to see presented their HONORARY MEDAL to Dr. Fothergill, for his Prize Essay *on the Suspension of Vital Action*), I cannot resist calling your attention, at this moment, to the establishment of a *Humane Society*, under our auspices, at ALGIERS. I repeat ALGIERS; for it is surprising, and almost incredible, though indeed we know it as a fact, that in that barbarous soil a spark of humanity is at length kindled! What a grateful contrast does this present of the Christian system to the barbarity of infidels. In that land, where a Muley Ishmael immolated with his own hand, eighty of his relatives, the amities of the Gospel have led to an establishment that saves the life even of a stranger! Those who can recal the commencement and origin of *this institution*, and the state of knowledge at that time, and should next survey the *present accumulation*, must experience singular pleasure in tracing the *progress and evolution* of SCIENCE as connected with the subject of the

The reader will instantly recollect, that the individual is no other than Dr. HAWES, to whose unremitting zeal and activity, aided by Dr. LETTSOM, and a few other such congenial characters, this Society owes its existence. The former, undoubtedly, was the first, in this country, who undertook to deliver a course of lectures on SUSPENDED ANIMATION, which was no easy task at that early period. He also was the first who proposed *honorary premiums* for the further elucidation of the subject. To him, as the ever active agent, may, in a great measure, be applied that emphatic expression of the celebrated Linnæus, who, on witnessing the superior activity, zeal, and energy, which distinguished London, beyond every other city he had visited, exclaimed with rapture,

“Punctum vitæ in vitello orbis!”

If such has been the progress of the present Institution in its early stages, what may not be expected, now that Pneumatic Philosophy holds up the torch to Medicine, to illuminate its votaries, and direct their course in this new path of science!—a science, no less difficult, than it is sublime and important; involving, at once, the most intricate problems in physiology, pathology, chemistry, and pneumatic philosophy!—Calculated not less to exercise the keenest faculties of the head, than to interest the finest feelings of the heart!

resuscitative art, much of which must be ascribed to the *disquisitions* which have resulted from the HONORARY PREMIUMS. I do not speak my *own opinion* merely, but that of Europe, for in almost every medical work of character, there are appeals to their judicious authorities as decisive of the facts, which they have established, enforced, and illustrated. Of this kind is the *valuable production*, which has, at this time, brought together so many of our members and friends in the cause of active humanity.

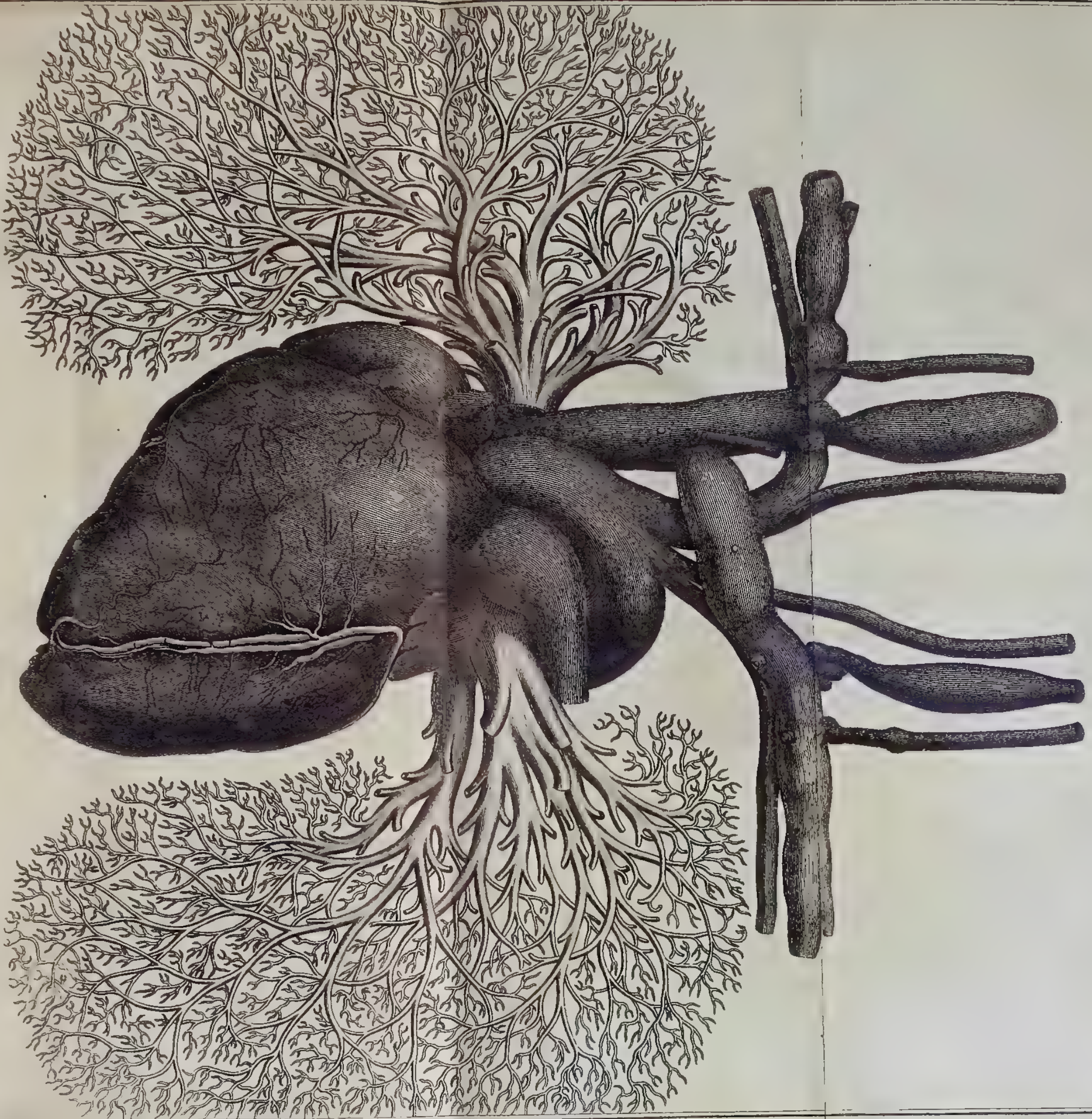
John Hunter's Proposals for the Recovery of Drowned Persons.

“ I consider an animal, apparently drowned, as not DEAD, but that only A SUSPENSION OF THE ACTIONS OF LIFE has taken place. I might compare the situation of such a person to that of a person in a *trance*. In both the action of life is suspended, without the powers of action being destroyed.

“ Drowning may therefore be defined to be, *a stop put to the actions of life in the animal, but without any irreparable injury to any vital part;—which action, if not restored by art in a certain time, is irrecoverably lost.*

“ The cessation of motion from drowning seems to arise from the lost of *respiration*, and the immediate effects which this has upon the other vital motions of the animal, except what may have arisen from the agitation of the mind, however the privation of breathing appears to be the *first cause*; and the heart's motion ceasing, to be the second or consequent; therefore most probably the *restoration of breathing* is all that is necessary to restore the heart's motion; for if a sufficiency of life still exists to produce that effect, we may suppose every part equally ready to move the very instant in which the action of the heart takes place, their actions depending so much upon it.

“ What makes it very probable, that in recovering persons drowned, the principal effect depends *upon air being thrown into the lungs*, is, what happens in the birth of children, when too much time has been spent after the interruption of that life which is peculiar to the *fœtus*; they then lose altogether the disposition for new life; and, in such cases, there being a total suspension of the actions of life, the infant remains to all appearance dead, and would in fact



die, if *air was not forced into its lungs*, by which means the action of the heart is established.

“ To put this in a clearer light, I shall give the result of some experiments which I made in the year 1755, upon a dog.

“ A pair of bellows was provided, constructed in such a manner, as by one action to throw fresh air into the lungs, and by another to suck out again the air that had been thrown by the former, without mixing them together.

“ The muzzle of these bellows was fixed into the wind-pipe of a dog, and by working them he was kept perfectly alive. While this *artificial breathing* was going on, I took off the sternum of the dog, and exposed to view the heart and lungs. The heart continued to act as before, only the frequency of its action was considerably increased. I then stopped the motion of the bellows, and the heart became gradually weaker and less frequent in its contraction, till it left off moving altogether. By renewing my operation, the heart begun again to act, at first very faintly, and with longer intermission; but by continuing the *artificial breathing* its action became as frequent and as strong as ever. I observed that every time I left off working the bellows the heart became extremely turgid with blood, and the blood in the *left side* became as DARK as that on the *right side*; both sides of the heart having the SAME COLOURED BLOOD*, which was not the case when the bellows were working.

“ *The situation of the animal appears to me exactly similar to drowning†.*

* Please to compare the plate on the *opposite page* with the *Map of the Heart* before given.

† This experiment by John Hunter, has great resemblance to that made an hundred years ago by the illustrious Dr. Hook. After he had laid open the thorax of a dog, he cut away the ribs and diaphragm, and removing

“Before I offer my sentiments on the method of treating persons who are apparently drowned, it may be necessary to state *three* Data.

“1st. So long as the animal retains the *power*, though deprived of the *action of life*; the cause of that privation being removed, the animal recovers.

“2d. It is necessary to mention, that I consider the *living principle* as inherent in the BLOOD, and derived from the AIR, viz. *that principle* which prevents the corruption of the body, and is the cause of all its actions.

“3d. The last proposition I assume as granted, is, that the *stomach* sympathises with every part of an animal, and that every part sympathises with the stomach; therefore whatever acts upon the stomach, as a cordial, or rouses its natural and healthy actions, and on the contrary, whatever affects it, so as to produce debility, has an immediate effect upon every part of the body.”——HUNTER.

These proposals were published in the Philosophical Transactions.

the pericardium, he kept the animal alive before the Royal Society above an hour, by blowing fresh air into his lungs with a pair of bellows. It was observed, that as often as he left off blowing, and suffered the lungs to collapse, the dog presently fell into dying convulsive motions, and soon recovered again on renewing the blast.—After he had done this several times, with like success, he pricked all the outer coat of the lungs with the slender point of a lancet, and by a constant blast, made with a double pair of bellows, he kept the lungs always distended, and without motion, and it was observed, that while the lungs were thus kept distended with a constant supply of fresh air, the dog lay still, his eyes were quick, and his heart beat regularly; but that upon leaving off blowing, and suffering the lungs to subside, the dog presently fell into dying convulsive motions, and as soon recovered again on renewing the blast, and supplying the lungs with fresh air.—*Vide* PHIL. TRANS.

PROPOSITION I.

“When assistance is called in, soon after the immersion, AIR, blown into the lungs, may be *sufficient* to effect a recovery. The DEPHLOGISTICATED AIR*, described by Dr. Priestley, may prove more efficacious than *common air*. It is easily procured, and may be preserved for any length of time in bottles.”—HUNTER.

Note.—To restore a person from a temporary suspension of vital action, is within the province of the physician: but to restore life, after it has entirely vanished, is an act of Omnipotence, and belongs only to HIM who gave it.

The former is merely to rekindle the flame of a taper, by gently fanning the ignited wick; the latter, to reanimate a corpse, after the vital spark is totally extinct.

From the effects of VITAL AIR,

1st. In giving a *florid colour* to the blood,

2d. In generating *animal heat*,

We learn, why in suspended respiration, the lungs ceasing to expand, and the blood to be changed in that organ, the heart ceases to contract, the arteries to vibrate, and finally, why the machine, though sound and entire in all its parts, yet on a sudden, like a clock whose *pendulum* is stopped, remains entirely at rest. In the latter, if we move but the pendulum, the wheels are immediately put into motion, and the clock again correctly marks its hours and minutes as before: so likewise in the animal machine (for such is the harmonious consent of parts), that if motion can but be renewed in one of the principal organs it is directly communicated to the next, and from thence to all the rest.

* As the doctrine of *phlogiston* is nearly exploded, *this gas* will be now better understood by the term OXYGEN or VITAL AIR.

Thus, if the lungs expand, and the blood imbibes the VITAL AIR, the heart recovers its action, the brain its energy, the nerves their sensibility; the grand obstacle once removed, and the subordinate springs of life presently resume their respective movements.

From the privation of VITAL AIR in drowning, we can *now* explain, why the blood grows dark, the lips and countenance livid, and why the body loses its native heat; since, by renewing respiration, circulation is renewed, and the blood, having regained its florid colour, all these symptoms soon disappear.

The primary object, therefore, in the suspension of vital action, is to institute *artificial respiration* till the *natural breathing* can be re-established.

Those who attribute the efficacy of this process to the mere mechanical expansion of the lungs, for the easier transition of the blood, regard not the quality of the air, nay some even have the folly to contend, that air blown warm from the lungs of a healthy person is better than atmospheric air.

Others deny that air, already vitiated by respiration, can be fit for the purpose (to say nothing of the indelicacy of the operation), and therefore justly prefer atmospheric air.

Being among the first, says the illustrious Dr. Fothergill, who recommended VITAL AIR in preference to the other two, not only from theory, but *actual experiment* on some of the smaller animals, I am happy to find its superiority has since been confirmed by many respectable writers both at home and abroad.

Nor is this to be wondered at, he adds, seeing it possesses every necessary quality of common air, in a super-eminent degree, and is alone capable of producing that chemical change in the blood, upon which *vital heat* and

irritability depend. For during the suspension of respiration, agreeable to what has been before hinted, the blood loses its florid colour, from being deprived of the VITAL PART of the atmosphere. The animal heat is diminished, and the action of the heart grows suddenly weaker every moment, until at length it ceases altogether.

In the act of drowning it is also well known, that though suffocation generally takes place after a full expiration, that from 50 to 100 cubic inches of air still remain in the vesicles of the lungs. This stagnant air must therefore be highly vitiated, and therefore injurious to life; it cannot be evacuated by pressure, much less meliorated by similar air conveyed from another person's lungs; it may however be corrected by atmospheric air, and completely restored by VITAL AIR.

On the whole, it seems reasonable to conclude, that in the treatment of drowned persons, respired air must be less proper than atmospheric, atmospheric than VITAL; and could the latter be as easily and cheaply procured as the two former, few persons could hesitate a moment in determining which of them they ought to prefer.

Whence is it then, that the use of VITAL AIR has hitherto been withheld from the human species, and confined to a few experiments on brute animals?—Because, it is even yet but little known; and its virtues less understood.—A remedy rarely to be had when most wanted, and never without some trouble and expence. But we may soon, however, expect some decisive experiments on this head, now that the VITAL AIR has not only unfolded the theory of respiration, digestion, and the animal heat, but also explains many other curious phenomena both in health and disease, and has been prosecuted with such uncommon ardour, by Drs. BEDDOES and THORN-

TON, as to give birth to some of the most brilliant discoveries that shed lustre on the present era.

PROP. II.

“It frequently happens in the case of drowning, that assistance cannot be procured till a considerable time after the accident; every moment of which delay renders recovery more precarious, the chances of which are not only diminished in the parts where the first powers of action principally reside, but also in every other part of the body.

“If a considerable time, such as an hour, has been lost, it will seldom be *sufficient* to inflate the lungs with air; the heart having by this time lost its nice connexion with the lungs.

“It will be necessary, having first inflated the lungs, to apply *volatile salts* to the nose. It will be better if it be applied up both nostrils, as such applications to the olfactory nerves are known to rouse the living principle and put the muscles of respiration into action, and are therefore likely to excite the action of the heart. Besides the salt of *vinegar*, the steam of the same may be employed, for affections of those nerves greatly affect the living principle, for while a strong smell of very sweet flowers, as orange-flower, shall in many cause fainting, the application of *vinegar* will immediately restore the powers to action again. Thus all perfumes in which there is some *acid*, rouses rather than depresses, as the sweet-brier, essence of lemon, &c.”—HUNTER.

PROP. III.

“*Electricity* has been known to be of service, and it is probably the only method we have of immediately stimulating the heart; all other methods being more by sympathy.”—HUNTER.

Note.—The effects of electricity were, some time ago, finely illustrated by the ingenious Abilgard, in many curious experiments on apparently dead animals; wherein, by a dexterous management of its power, he is said to have been capable of alternately suspending and restoring animation at pleasure. The experiments have since been repeated by an eminent electrician* in London, and with similar effects. On smart shocks being passed through the head, the animal immediately becomes motionless: on transmitting the gentlest vibratory shocks through the region of the heart, oscillations of the external muscles instantly ensued.

When the operation was suspended for some minutes, or its duration altered to more remote parts, the animal relapsed into its quiescent state, and constantly revived on its being repeated as at first. And what is very worthy of attention is, the vital organs were more certainly excited, and more vivid motions produced by slight, than when the shocks were increased: the latter appearing to retard, rather than promote recovery. It was also found, by the last experienced electrician, to afford present relief in syncope, though when administered with violence in people of a nervous habit, it is known frequently to produce that state.

From the above phenomena, it seems reasonable to conclude, that electricity ought to be principally directed to the heart, lungs, and diaphragm, in the form of *gentle shocks*. Applied in a moderate degree, it excites vital action after other stimuli have ceased to act: carried to an extreme, it destroys irritability, and life itself. For whether the stroke be sent from a thunder cloud, or a highly charged electrical battery, is immaterial; the effect from either may alike prove fatal. Electricity, therefore, pre-

* Mr. Parfington.

sents us with one of the most powerful stimulants hitherto discovered, which, like other active remedies, may be salutary or injurious, according as it is managed. Hence the impropriety of those violent shocks of electricity formerly given in palsy, chlorosis, &c. which, like other exhausting stimuli, not only defeat the intention, but prove extremely injurious. Hence, perhaps, the surprising success of electricity in some cases that appeared desperate; and its failure in others, after it had produced some flattering tokens of recovery. Instances of both which are to be met with in the Reports of the HUMANE SOCIETY for the years 1787 and 1789. Nor is this to be wondered at, seeing its effects may be so greatly diversified according to the different modes of application, by which its powers are adjusted. Thus it may be directed to pass silently along the metallic wire; to melt it instantly; or disperse it with incredible fury. Thus a violent blast of air extinguishes the burning taper, while a gentle breeze rekindles it. In like manner, the tickling the soles of an infant causes convulsive laughter; while rubbing that part produces no such effect.

As it is known from various observations, that the blood passes most freely through the pulmonary vessels, when the lungs are expanded by a full inspiration; if at this juncture, the heart can be excited to exert its power, while the resistance is so considerably diminished; it must more easily propel the blood forward, when part of it will enter the left cavity, now almost empty. This being brought into action, will, in its turn, urge it forward into the arterial system.

As soon as the lungs, therefore, are fully expanded with air, and the more *pure* this is, undoubtedly the better; at that moment, let the heart be excited by a gentle electrical shock, passed obliquely from the right side of the chest

through the left, in the direct course of the heart and pulmonary vessels. Let the lungs be now emptied of the air, and again expanded, when another shock may be given. The heart being thus excited into action, the *black blood*, loitering near its right cavity, will begin to move forward, and to resume a more *florid colour*. This being gradually renovated, will renew the action of the left auricle, where the circulation will also be speedily restored, and that, perhaps, with more certainty and expedition, than by the usual mode of conducting the operation.

PROP. IV.

“It will be necessary to convey some stimulating substance into the *stomach*, to rouse this seat of universal sympathy. This operation should be performed with all possible expedition, because the instrument, by continuing in the mouth, might produce sickness, which would tend rather to distress than rouse the living principle.

“The process recommended under the first head of treatment should still be continued, while those under the other heads are putting into practice; for I considered these only as auxiliary to the first. The first, in many cases, may succeed alone; but the other injunctions without the first must, I think, always fail where the powers of life are considerably weakened.”—HUNTER.

Note.—When the heart has once been made to receive the florid blood, it will be stimulated to new action, and the vital functions will be restored. It will not, however, be sufficient to stimulate the *heart* and *lungs*, we must at the same time stimulate the *stomach*. Clearly to comprehend the purpose of this operation, the reader should be previously well acquainted with the discoveries of modern chemists. Some have said wine must be conveyed into the

stomach; but we should not be satisfied with being guided by the hand, without understanding the reason why such an application is attended with success. In the use of medicines we should endeavour to ascertain their mode of operation; for while the rash empiric wanders in the dark, the cautious and rational practitioner will be anxious to investigate the path of nature, and to account for her proceedings, while he ventures to prescribe. I shall attempt, therefore, to throw some light upon a subject which is *new*, and therefore little understood.

It is well known from chemistry that, in nature's laboratory, the juice of the grape is composed of three ingredients.

- { 1. HYDROGEN,
- 2. OXYGEN,
- { 3. CARBON.

By the process of distillation, the HYDROGEN is separated in a great measure from the OXYGEN and CARBON, and we obtain what is called *alkohol* or *brandy*.

Alkohol itself contains some oxygen, but by combustion, it takes to itself still more from the atmospheric air, and thus by experience it is found, that 16 ounces of *alkohol*, by combustion, produces 18 ounces of pure *water*.

The combustion here is nothing else but the combination or chemical union of HYDROGEN with OXYGEN, from which results a third substance *water*, whilst the HEAT which was before in combination with the oxygen escapes.

Pilatre de Rozier has frequently amused his friends by inhaling a large quantity of HYDROGEN AIR, which may be taken into the lungs without fear of injury, and then applying his mouth to a tube, he blew out the air unmixed with atmospheric air, and fired it at the end of a tube, so that he appeared to breathe *flame*. By this operation

water was produced, which ascended in the form of vapour.

In order to give a distinct idea of the quantity of heat arising from the combustion of HYDROGEN AIR, I shall only mention that one pound of this melted 295lb. of ice, whereas in similar circumstances wax candles weighing one pound melted only 133lb.

These observations I have presented to the student, in order to give him a clear and distinct idea of the substances which I have had occasion to mention; by which he will see the strong affinity and chemical attraction between HYDROGEN and OXYGEN, the latter of which, as I have stated, is by the *lungs* derived from the atmosphere, whilst the former is conveyed into the system by the assistance of the *stomach*, and is most readily obtained from ether, alkohol, and wine.

So much for what has been discovered by the chemist with his retorts. But it is time that we should return to the living retort, and consider by what laws the proportions are established between the OXYGEN to be derived by inspiration from the atmosphere, and the HYDROGEN to be conveyed into the system by the action of the stomach.

The reader, no doubt, calls to mind the memorable experiments of Mr. Spalding, who observed, that in proportion to the quantity of food received into the stomach; if it abounded with HYDROGEN, the system coveted OXYGEN, taking up a greater quantity of it by respiration from the atmosphere, as his diving-bell clearly demonstrated; and he will also remember having met with this remark in the case of bilious autumnal fever, by the Rev. Mr. Townsend, in his *Elements of Therapeutics*. *The attentive observer will take notice that there is a certain proportion between the VITAL AIR received into the lungs, and THE*

QUANTITY OF FOOD *which can be digested in the stomach.*

When I made the last observation I was not aware that the same had occurred to any one before me. But I have the pleasure to see the same idea had also occurred to Dr. Thornton, as appears in his *Thesis*, and to Dr. Beddoes, as is seen in his *Letter* to Dr. Darwin. He had been breathing air, such as contained almost equal parts of OXYGEN and AZOTIC AIR. *His spirits were in consequence elated; his appetite great; and he ate one third or one fourth more than before, without feeling his stomach loaded.*

From these premises I trust it will be clear, why, in cases of suspended animation, we must not be contented merely with conveying VITAL AIR into the *lungs*, but must at the same time convey HYDROGEN into the *stomach*, which powerfully attracts this substance so essential to vitality.

In time of health, cordials, on being received into the stomach, presently manifest their enlivening effects; even before they can have time to enter the lacteals, their stimulus is diffused through the remotest parts of the system. In order, therefore, to restore the motion of the heart, through the medium of the stomach, some active cordial ought to be early administered. This having been considered by the faculty as unsafe, if not wholly impracticable, until the power of swallowing should be restored, it has hitherto on that account been very rarely attempted. Fortunately, however, we can now with confidence assert, that instead of waiting for the return of deglutition, an event which may never happen, fluids may at the beginning be immediately conveyed into the stomach, without occasioning the smallest hazard of suffocation.

Among the class of internal stimulants, spirituous liquors, as rum, brandy, or usquebaugh, are well adapted, as being

speedy in their operation: but the exhausting effect which succeeds the action of these, and all other potent stimuli, tends to limit their use, and demands no small circumspection.

Good wine, where it can be had, though less active, affords a more generous cordial, and seems to deserve the preference; for during vital suspension, *irritability* must be considerably *accumulated*. Hence the necessity of artificial stimuli to compensate for the defect of the natural ones in carrying off the *redundancy*. But if these are too powerful, they may prove equally destructive, by totally exhausting the moving fibres. Thus may the salutary efforts of nature be overpowered by the officiousness of art, a circumstance which sometimes we have had occasion to observe with regret.

PROP. V.

While these things are going on, viz. the INFLATION of the *lungs* and STIMULATION of the *heart*, an assistant should carefully *heat* the bed-clothes. I consider *heat* as congenial to the living principle. But from observations and experiment it appears to be A LAW OF NATURE in animal bodies, that the *degree* of *external heat* should bear *proportion* to the *quantity* of *life*: as it is weakened, this proportion requires great accuracy in the adjustment; while greater powers of life allow a greater latitude.

“ I was led to make these observations by attending to persons who are *frost-bitten*; the effect of cold in this case being that of lessening the living principle. The powers of action remain as perfect as ever, only weakened; and heat is the only thing wanting to put these powers into action; yet heat must at first be *gradually* applied, and proportioned to the quantity of the living principle; but as that increases you may increase the degree of heat.

“ If this method is not observed, and too great a degree of heat is at first applied, the person or part loses entirely the living principle, and mortification ensues. This process invariably takes place with regard to men. The same thing, I am convinced, happens to other animals. If an eel, for instance, is exposed to a degree of cold sufficiently intense to benumb it till the remains of life are scarcely perceptible, and still retained in cold of about 40 degrees; this small proportion of living principle will continue for a considerable time without diminution or increase: but if the animal is afterwards placed in a heat of 60 degrees, after shewing *strong signs* of returning life, it will die in a few minutes.

“ If a lizard, or snake, be taken from its autumnal hiding place, and exposed to the sun’s rays, or placed in any situation which would give vigour to the same kind, possessed of a larger share of life, they will immediately shew signs of *increased** life, but quickly sink under the experiment and die; while others, reduced to the same degree of weakness, as far as appearances can discover, will live for many weeks, if kept in a degree of cold proportioned to the quantity of life they possess.

“ I observed many years ago, in some of the colder parts of this island, that when intense cold had forced blackbirds or thrushes to take shelter in out-houses, any of them that had been caught, and, from an ill-judged compassion, exposed to a considerable degree of warmth, died very soon. The reason of this I did not *then* understand; but I am *now* satisfied, that it was owing, as in other instances, to

* *Sedative powers*, says Dr. Brown, weaken the tone of the fibre, but by accumulating IRRITABILITY, they predispose the fibre to an *inordinate action* upon the application of a *slight stimulus*. How much does Dr. Brown’s and John Hunter’s doctrine then *coincide*, if we except the *difference of expression*!

the degree of heat being increased too suddenly for the proportion of life remaining in the animal.

“From these facts it appears, that warmth calls forth a great exertion of the living powers; and that an animal in a weakly state may be obliged to exert a quantity of the actions of life sufficient to destroy the very powers themselves. Heat must therefore be carefully regulated according to the return of the powers of life, and must be adjusted accordingly.”—HUNTER.

Note.—Heat is so essential to life, that without a certain degree of it, neither animals nor vegetables could subsist. The eggs of oviparous animals, the seeds of vegetables, and growing plants, discover, by the thermometer, applied to their internal parts, a degree of temperature evidently exceeding that of the circumambient atmosphere. Heat accompanies the embryo from the earliest period to the last stage of its existence, and therefore has been considered by some as the source of vitality. Hence, the fecundating egg brings forth in due season, whether the proper degree of heat be communicated by incubation; or by the temperature of a well-regulated oven. Hence, also, the myriads of animated beings, which from imperceptible ova, are ushered into existence by the summer's sun! Hence dormant animals are roused from a torpid state, by the vernal warmth; and hence too, drowned persons have sometimes been reanimated by the solar rays.

From these, and similar considerations, it was very natural to conclude, that to restore heat to the body, must be one of the most powerful means of restoring animation. Accordingly, it has hitherto been attempted, by the application of artificial heat; under an idea, that until this could be accomplished, every other means would prove ineffectual; without considering, perhaps, that an inanimate substance of such a bulk as the human body, con-

taining a large quantity of matter under a small surface, must acquire heat very slowly ; that to accomplish this in the internal parts (were it even practicable with safety), would demand great length of time, during which other measures no less essential must be postponed.

When *respiration* ceases in a drowned animal, the power of *generating heat* is suspended, and the body loses the remains of its natural warmth, till at length it is reduced to the temperature of the surrounding medium. During this, if we attempt to raise the heat suddenly to the natural standard, we exhaust the feeble remains of life. Nay, although we apply artificial heat by slow degrees, yet still, if no other means are used, it fails of success. But if we have first recourse to *artificial respiration* in the manner already described, the experiment will often succeed, and produce the desired effect. The lungs being thus supplied with air, the blood is again rendered fit to receive a fresh supply of latent heat, and to diffuse it, through innumerable arteries and veins, from the centre to the circumference. Thus is the natural heat restored, and communicated to every part of the system, with more certainty and expedition, than by any external means that can be devised.

The most efficacious method of restoring heat, then, is to renew the *generating power*, by renewing *respiration*. For, till this natural process can be re-established, all that can be reasonably expected from the application of artificial heat, is to prevent the natural heat from being conveyed off ; and to preserve sensibility and irritability, till the generating power can be renewed, on which they so intimately depend. Even in this view, it is a matter of considerable importance, and demands no small attention in the management.

Where the temperature of the body is considerably

reduced, a small degree of additional heat will produce powerful effects. Hence with dormant animals that are torpid, a moderate degree of additional heat revives them ; whereas a greater, even such as imparts vigour to them under other circumstances, speedily destroys them.

Thus nature instructs us, that the artificial heat employed in restoring animation, ought to be very moderate; and the more so, in proportion as the natural heat is diminished.

If, at the lowest pitch of temperature, the application of snow, or cold water, affords a more safe and efficacious stimulus than artificial heat, is there not some reason to suspect, the cooling method might also prove preferable, at all the intermediate degrees?—That in drowning, for instance, where the temperature of the body, through exposures to extreme cold, is often reduced many degrees below the standard, might not a momentary application of this method, at the beginning of the process, prove more salutary than that sudden transition to artificial heat adopted by modern practitioners ?

The heat might be augmented by degrees, and the person put between blankets, and bladders of tepid water, or flannels wrung out of the same, or in vinegar, might in some measure supply its place. These may be applied to the region of the stomach ; to the arm-pits ; to the groin ; and to the extremities : their warmth being retained by a covering of warm flannel. The room should have no visitants to corrupt the air, its heat should be between 56 to 64 degrees of Fahrenheit's scale. But let it be ever remembered, that till the *generating power* can be restored to the frame, it is in vain that we attempt by these, or any other means, to raise the heat of the body to the natural standard.

PROP. VI.

“ *Motion* may possibly be of service, it may at least be tried; but, as it has less effect than any other of the above prescribed stimuli, it should be the last part of the process.

“ I would recommend to the operator the same care in regulating the *proportion* of every one of these methods, as I did before in the application of *heat*; as every one of them may possibly have the same property of entirely destroying the feeble action which they have excited, if administered in too great a quantity; instead, therefore, of increasing and hastening the operations on the first signs of returning life being observed, as is usually done, I would recommend their decrease, or that they be adjusted as nearly as possible to the powers as they arise. As the heart is commonly the *last part* that ceases to act (*ultimum moriens*), it is probably the *first part* that takes on the action of recovery. When it begins to move I would advise the observing, with great attention, when the muscles of respiration begin to act, that our endeavours may not interfere with their natural exertions, and that we may co-operate with nature; and I would advise the lessening also, at this time, by degrees, the application of air to the lungs.”—HUNTER.

Note.—Brisk *agitation* is best performed between two people; one taking hold of the patient's feet, while the other supports the shoulders, with the head properly elevated. This has of late been suspected of having a dangerous tendency, though apparently without any just cause. It certainly affords a safe and speedy mechanical stimulus to the whole machine, and may be executed in less than three minutes; producing all the advantages that

could be hoped for from the action of an emetic, and without the danger.

The successive concussions thus communicate to the part and internal organs, tend to put the stagnant blood in motion ; to renew oscillations in the moving fibres ; and to incite the hidden springs of life into action.

By brisk agitation still-born children have sometimes also been unexpectedly brought to life. Sometimes drowned persons have been restored by the same means.

Being a simple and harmless effort to restore animation, and easily performed by the lower class of people, it ought by no means to be discouraged. If it fails it does no injury, unless it be performed with unnatural violence ; if it succeeds, it supersedes the use of other measures.

A remarkable instance of recovery accidentally occurred some years ago, where a sudden jolt of a coffin is said to have disturbed the repose of the apparently dead lady within ; who, to the surprise of the persons shoving the coffin, and utter confusion of her husband, instantly gave a piercing shriek ! This being repeated in her usual shrill and well-known key, left him no room to doubt of his *cara sposa* being actually alive. It therefore obliged him, though very reluctantly, to counter-order the sepulchral ceremonies, and release the supposed corpse ; who, it is added, lived many years after, till at last she had the satisfaction of seeing her husband “ peaceably inurned ” in the very same spot intended for herself.

PROP. VII.

“ The steam of some *stimulating substances*, which are of a warm nature, should be employed as an enema.”—
HUNTER.

Note.—Not only the *stomach*, but the *intestinal tube* an-

nexed, constituting the alimentary canal, is every where most bountifully supplied with nerves, by which an intercourse is carried on with all the principal organs, and propagated to the remotest parts of the system. This canal, therefore, through its whole extent, may be well considered as the centre of sensibility and nervous sympathy; and consequently deserves particular attention in all cases of vital suspension. Hence various stimulants have been proposed for supporting its peristaltic motion, and for rendering it a proper medium for renewing nervous energy, by means of its sympathy with the other vital organs.

Forms of enema. 1. Take half a pint of Madeira wine; add one drachm of the tincture of cinnamon or lavender, or half a drachm of pure spirit of sal ammoniac.

Or 2. Take of warm water half a pint, of fresh mustard half an ounce, of ethereal oil of turpentine two drachms. —The whole to be incorporated with the yolk of an egg.

Or 3. Take of strong infusion of horse-radish root twelve ounces, of pure sal ammoniac one drachm.

PROP. VIII.

“ *Friction*, with agitation of the body, were the earliest methods employed for the recovery of the drowned; and still constitutes almost the only means known to the common people. Notwithstanding the rude unscientific manner in which they generally conduct the former operation, yet there are not wanting instances of its success, which probably would have been more numerous, had it been directed by more skilful hands.

“ Its general effects may be understood, from its stimulat-

ing the extremities of the cutaneous nerves, which sympathize with the principal internal organs. But still more, in the present instance, from its exciting the arteries to propel the blood into the corresponding veins, and from thence forward to the heart, while it favours the production of animal heat."—HUNTER.

In order to render friction perfectly safe, and at the same time to give it its full efficacy, the following cautions may not be unnecessary :

1. Violent friction, in these cases, is generally unnecessary ; it seldom can be useful ; and it may often prove hurtful.
2. To obviate any danger that may arise from friction, artificial respiration, with electricity, ought, in propriety, to precede its use, that a free passage may be first opened through the lungs, when friction may be safely pursued with more freedom.
3. Where, through want of skilful assistants, the previous process cannot be properly managed, the friction ought to be more gentle ; beginning at the upper and lower extremities, where the circulation is always the most lingering, proceeding gradually to the thighs, abdomen, and chest ; where it should be occasionally suspended, about half a minute at intervals, for the heart to evacuate itself.
4. Upon the whole, friction may be performed to the best advantage by the hands alone ; the natural warmth of which will be communicated to the body, and gradually increased by the continued attrition.
5. Next to friction with the warm hand, the rubbing with a flesh-brush may occasionally be had recourse

to ; or, what may prove still more advantageous, hare skins, or warm flannels, which may be well impregnated with the penetrating fumes of gum benzoin, kept in readiness, in a state of fusion ; besides its stimulating and gently bracing quality, which seem well adapted to the present purpose, this fragrant gum possesses a pleasant odour, which, instead of annoying, may prove grateful to the medical assistants, during their benevolent and truly meritorious exertions in the cause of humanity.

PROP. IX.*

“ I would by all means discourage *blood-letting* ; which I think weakens the animal principle, and life itself, consequently lessens both the power and disposition to action : and I would advise to be careful not to call forth any disposition that might depress, by introducing any thing into the stomach, which ordinarily creates *nausea*, as that also will have a similar effect. I would therefore avoid throwing up any enema, which is likely to produce an evacuation, as every such evacuations also tend to lessen the animal powers. I have purposely avoided speaking of the *fume of tobacco*, which always produce sickness or purging, according as they are applied.”—HUNTER.

Note.—In concluding these proposals for the recovery of drowned persons, we would exhort the humane practitioner, and all others, to trust in God’s mercy, and not to despair until every exertion has been duly employed.

* Prop. IX. relates to what should be avoided. The medical committee, after the receipt of Hunter’s paper, entered their caveat against *blood-letting* in suspended animation, and the *fumes of tobacco* are getting fast out of fashion.

“LATEAT SCINTILLULA FORSAN,” should be constantly remembered upon every such melancholy occasion.

Having thus impartially examined at some length the remedies employed for the restoration of suspended animation, and endeavoured to ascertain their merit with a view towards improvement; we proceed to reduce the method of conducting the process into a more compendious form.

In all cases of apparent death, time presses, and the urgency of the case demands uncommon expedition. In this critical situation, the *vital spark*, like the last glimmering of a taper, at each succeeding minute, grows more and more feeble, till the instant it expires! Every moment is precious to one who hangs, as it were, betwixt time and eternity.

To prevent delay, by which, alas! too many have already perished, proper HOUSES OF RECEPTION, supplied with the necessary apparatus, ought to be established at the expence of the parish, in every market town situated near lakes or rivers, and particularly in all sea-ports throughout the kingdom.

The overseers of the poor, church-wardens, and clerks of the several parishes, should be *instructed* in the means proper for the recovery of drowned persons: for the operation of inflating the lungs completely, demands considerable address; and as it constitutes the most important part of the process, it were to be wished, that not only medical pupils of all denominations, but also other intelligent persons, in every parish, were fully instructed how to perform it with dexterity.

Possessing the proper instruments,* the most efficacious measures should be immediately pursued by the assistants;

* These may be seen at Savigny's, No. 28, King-street, Covent-garden.

not in hurry and confusion, but with method and regularity, conformable to a well-digested plan.

As soon as the object arrives, all spectators should be excluded the room, except those that are absolutely necessary, and which perhaps never need to exceed seven in all, including the medical assistants.

A greater number will not only embarrass the operation, but render the air impure by their respiration, and the contaminated air of a crowded room, in cases apparently favourable, may defeat all hopes of success, as we have seen with regret in more than one instance.

If the weather will permit, the windows should be kept open, and temperature be regulated between 56 and 64 of Fahrenheit's thermometer,

If the season be perfectly serene, the body may be placed in the open air to receive the genial warmth of the solar rays, while the other necessary means of recovery are pursued.

The body, if wet, must be immediately well dried, to prevent the chilling effects of evaporation; and then be wrapped in warm blankets, or the warm clothes taken from some of the spectators, unless the cooling process should be first necessary, in consequence of the object being in a half frozen state. For in that case the body ought to be rubbed with snow, or flannels wrung out of cold water or vinegar, before any degree of artificial warmth can be safely applied.

Having prepared a bed or matrass, on a table of a proper height, the subject is to be placed thereon, with the head elevated by two pillows; when the different parts of the process may be conducted in the following order:—

- 1st. Let the lungs be immediately inflated by means of the proper instruments. When no medical

assistant can be had in time, this operation may be tolerably performed, even by the common people, by only inserting the pipe of a pair of bellows into one nostril, while the mouth and opposite nostril are closed by an assistant, and the windpipe gently pressed back. Then by forcing air into the lungs, and alternately expelling it by pressing the chest, respiration may be imitated. Or, upon an emergency, air may be blown into the lungs through a tobacco-pipe, a quill, or even a card folded into the form of a tube.

2d. The electrical machine being prepared, and the lungs expanded, let one discharging rod be placed just below the right breast, and the other above the short ribs of the left, the electrometer being moved a quarter of an inch from the jar, let the electrical current be passed directly through the heart. The electrical shock being given, let the lungs be emptied by making an expiration with the double bellows, or by suffering air to escape by the mouth, while gentle pressure is made on the chest. The moment this is accomplished, let the lungs again be expanded, and the shock repeated, varying its direction, its power, and its frequency, as circumstances may point out.

3d. Particular stimuli may next be applied to the organs of sense, as a strong light to the eye, and pungent substances to the olfactory nerves, especially the salt of vinegar.

4th. These operations being carried on for five minutes, let the stimulating cordial be conveyed through the flexible tube into the stomach, by pressing the vegetable bottle in which it is contained.

- 5th. Immediately after this, either of the stimulating enemas may be also properly administered, or, what would perhaps be preferable, VITAL AIR. The cordial, and enema, may, if necessary, be repeated near the close of the process.
- 6th. These internal stimulants being given to provoke the action of the heart, bladders of tepid water should be applied to the region of the stomach, and to the extremities.
- 7th. The legs and arms must be now diligently rubbed with the warm hand, or with flannel, or a hare-skin, impregnated with the fumes of gum benzoin. The friction must be gradually extended to the thighs, abdomen, and chest.
- 8th. At that critical period, when sneezing, slight twitchings, or gasping, mark the first dawn of returning life, instead of increasing, it will be prudent to moderate the stimulating powers.
- 9th. The process above mentioned should be continued the full space of three hours, with very few intermissions; unless the vital functions should be restored sooner. If, at the end of that period, the unfavourable symptoms, instead of diminishing, should increase, the case may be considered as utterly hopeless, and therefore the process may be discontinued. Still, however, before quitting the room, it may not be improper to order a strong blister to be applied to the region of the heart, and warm sinapisms to the feet, first sprinkled with the volatile alkaline spirit.
- 10th. When the natural respiration and the power of swallowing are restored, the patient should be put into a bed moderately warm, with his head properly raised, and his feet wrapped in warm flannel. Warm

whey, and other diluents, may now be administered to encourage a gentle perspiration. But he ought by no means to be left alone, till he has perfectly recovered his senses: some persons having relapsed, and afterwards perished, from being deserted too soon, even after the functions were apparently restored. Unhappy instances of this sort have been properly noted in the Society's Reports.

- 11th. Should feverish symptoms ensue, accompanied with a sense of heaviness, or dull pain in the head or chest (as frequently happens in consequence of the severe discipline so lately undergone), moderate bleeding, together with mild laxatives and cool regimen, will generally afford the desired relief.

Mr. B——, of Duke-street, from a loss in business, which afterwards turned out to be only an alarm, for the party stopped, but did not ultimately fail; this gentleman hung himself. He was suspended upwards of twenty minutes. When cut down some fruitless attempts were made by medical practitioners, but he was left for dead. Dr. Thornton was called in, and he knowing the urgency of the case, procured immediately a common pair of bellows, mustard, and boiling water. Having first inflated the lungs, and put mustard up the nostrils and into his mouth, he dipped a towel into the scalding water, and raising the man, applied it over the breast, especially near the region of the heart. Heat was communicated to that organ, action roused, and from that instant he was restored. For this, and other recoveries, in suspended animation, Dr. Thornton received a medal from the Humane Society, with this honourable inscription, "OB VITAS RESTITUTAS."

S E C T. III.

Of Darkness.

As a due degree of stimuli is necessary for the maintenance of firm health, we now see the reason why confinement in dungeons, independent of dampness, is so injurious to the health of prisoners: and why the meaner sort of houses in this country, since they have been *darkened** in consequence of the heavy window tax, have been observed to exhibit a race of more pale and sickly inhabitants. Finally, why the *gloomy chambers* of the sick, labouring under asthenic diseases, are rendered more unwholesome, and acquire additional horrors, by indiscriminately shutting out the cheerful beams of day: and why the effects of all diseases of this class are increased by thus imprudently depriving the patient of one of the most exhilarating cordials in nature.

Blanched plants lose their green colour and become white, and are not then capable of supporting a great quantity of LIGHT. In the *white Negro*, born of black parents, exhibited in London, the hair was of a *silver white*; the eye had a ferrety appearance, and was so *impatient* of the *stimulus* of LIGHT, that it was almost in constant action. These accidental varieties in the human species are properly called MOON-EYED, for they cannot endure the glare of light from the sun, and though they enjoy his reflected rays from the moon, they are not able to

* The fact was repeatedly noticed in his different journeys by the philanthropic Mr. Howard; and it is notorious to every eye, that the servants who are stewed in dark chambers deprived of *fresh air* and the *morning light*, exhibit the most sickly appearance. It requires another Howard to point out the *evils* sometimes inadvertently inflicted by the *governors* on the *governed*, and to stir up HUMANITY in the cause of *suffering Nature*. It would be very easy in taxes to make proper exemptions, and garrets and poor people's windows, especially large mansions converted into schools, should be wholly excepted from any tax.

behold that luminary. The nose in this *white Negro* was flat, exactly resembling that of a black, and the lips were thick, and the skull prominent from behind. No doubt, therefore, remained of this woman having been born of negro parents; and the person who shewed her had attestations to convince the most incredulous. This variety of the human species has been particularly observed in three different districts of America. Their skin is covered with a fine hairy down of a *chalky white*; the hair of their heads, their eye-brows, and eye-lashes, are of the same hue. They are universally described by all travellers as a race of *low STATURE*, of a *feeble MAKE*, and *incapable of enduring the slightest FATIGUE*.*

Two temperaments, as they have been called, in physis, have been long observed. The external appearances of the *sanguine* or *irritable temperament*, are these. The hair is soft, and never much curled, except in infancy, is of a pale brown colour, and from thence passing through the different shades from the auburn to the bright red, the skin is smooth and white, and subject to freckle; the cheeks ruddy, the eyes most commonly blue; the habit of the body soft and plump; after the period of manhood disposed to obesity; the frame easily disturbed, and the mind sensible, and disposed to the alternate successions of mirth and sadness, accompanying both with tears.

The other temperament is called the *dark*, or *melancholic*. In this the external appearances are the following. The hair is hard, black, and curled; the skin is coarser, and of a dun colour, the complexion running from all the shades of brown, until it arrives at a complete jet. The eyes are constantly black: the habit of the body rather meagre; strength considerable, mind slow, and disposed

* See Robertson's History of America.

to seriousness, caution, and timidity, with but little sensibility, tenacious of emotions when once excited, and therefore revengeful.

If we consider the complexion of different countries, we shall find them dark in proportion to the nature of the climate. In general it may be asserted, that, as we approach the line, we perceive the inhabitants of each country grow browner until the colour deepens into perfect blackness. All Europe, almost the whole of Asia, and the temperate parts of Africa, are occupied by men of a fair complexion. All the torrid zone in Africa, some of the warmer regions adjacent to it, and a few countries in Asia, are filled with people of a deep black colour. If we trace the nations of our continent, making our progress from cold and temperate countries towards those parts which are exposed to the influence of vehement and unremitting heats, we shall find the extreme whiteness of their skin soon diminish, and its colour deepen gradually as we advance; and, after passing through all the successive gradations of shade, terminate in an uniform unvarying black. Thus, taking our standard from our own country, we find the French, who are more southern, a slight shade deeper than *we*; going further down, the Spaniards are browner than the French; the inhabitants of Fez darker than *they*; and the natives of Negroland the darkest of all.* The *irritable principle* in the fibre is also found much to correspond with *these shades*. In all regions, however, the *children* are born *fair*, or at least *red*, and grow darker or black as they advance in life.

* That the complexion depends solely upon climates is ably demonstrated by Dr. Smith. There are now Jews in Africa who observe all their religious ceremonies, and do not of course intermarry with the natives, yet they are completely black, no traces of the European features remaining. His arguments extend equally cogent throughout a whole octavo volume.

S E C T. IV.

Of Cold.

During the winter, by the absence of the stimulus of *heat*, and in part of *light*, plants and many animals become *torpid*, the organs of circulation and of nutrition then perform their functions but languidly, and life itself appears suspended. In consequence of the *diminished action* of these *stimuli*, the IRRITABILITY *accumulates*, and manifests itself at the return of *spring*. A slight degree of heat *then* produces powerful effects upon the fibres thus *delicately irritable*. Animals, which had concealed themselves under ground, even when the cold is greater than in autumn, venture forth from their subterraneous retreat, trees and plants put forth their leaves and blossoms, and birds, and animals, and man himself, is sensible of the stimulus of heat from the return of *spring*, his fibres being rendered *more irritable* by the winter's cold.

Dr. Hale, in his *Vegetable Statics*, relates that he cut down a vine, and cemented to its mutilated stump glass tubes, each 7 feet long, and one-fourth of an inch diameter, with brass caps, by which they were screwed on one above another, till they rose to the height of 36 feet.

By these gages it appeared,

- 1st. That the *sap* began visibly to *rise* MARCH 10, when the thermometer by day stood only at 3 degrees above the *freezing point*;
- 2d. That, APRIL 18, it was at its *height* and *vigour*;
- 3d. That from *that time* to MAY 5th the force *gradually decreased*;
- 4th. That it constantly rose *fastest* from sun-rise to about 9 or 10 in the morning, and then *gradually subsided* till about 5 or 6 o'clock in the afternoon;

- 5th. That it rose *sooner* in the morning after *cool weather*, than after *hot days*, and in *proportion* to the *coldness* of the *night* and *subsequent heat*;
- 6th. That after *several successive cold days and nights*, the sap would rise during the *whole day*, if it chanced to be *fine*, although *slowest* at *noon*.
- 7th. That if warm weather had made the sap flow vigorously, that vigour would be *abated* immediately by a cold easterly wind and a cloudy sun, when the sap would *sink* at the rate of an inch per minute: but when the sun shone out, and the wind shifted, it rose again as usual.
- 8th. The OLDEST VINES were *soonest* affected by a *change of temperature*, and in them the sap *first* began to *sink*.
- 9th. And, on the contrary, when the tube was fixed to a very short stump of a YOUNG VINE, and at only 7 inches from the ground, the sap flowed *incessantly*, and *fastest* of all, in the *greatest heat* of the day, *sinking* only after *sun-set*.*

He then makes this *general conclusion*, that the rapidity with which the sap circulates in the vine during SPRING is *five times greater* than the *rapidity* with which the *blood* flows in the *arteries* of a *horse*, that it is *considerably slower* in the SUMMER than in spring, very *languid* in AUTUMN, and *ceases altogether* in the WINTER.

* This last observation is very valuable, and exactly applies to the *human frame*. If a child or an old man take a moderate portion of the strong stimulus of opium or wine, an *exhaustion* of the irritability of the fibre ensues, as was shewn before; but if the same quantity be given to a person in the vigour of health and life, it seems to call forth the irritability of the fibre without exhausting it, and the actions of life become increased, and sleep does not take place before the customary hour. This will be further illustrated when treating on the different effects of the cold bath on strong and very weak constitutions. Vide p. 90 of this volume.

The above experiments clearly demonstrate, that it is not from *heat* and *light* alone that the sap rises in the vine, for if that were the case it would *increase* as the heat increased, it would be greatest in the *noon-day* and in the *height* of *summer*, and *less* in *spring* than in *autumn*, whereas the reverse is here shewn to be the case. It must therefore depend on the IRRITABILITY of the fibre, which gets *exhausted* by the stimulus of *heat* and *light*, and is *accumulated* by its *absence*.

In the same way the IRRITABILITY of the *hedysarum gyrens* is exhausted by the heat of the noon-day sun; and, according to the experiments of FONTANA, it is proved that the IRRITABILITY of the *sensitive plant* is *great* in the *morning*, *diminished* during the *heat* of the *day*, and *little* or *none* in the *evening*.

Hence it is that the return of *cold* and *frost* in the *spring* is so *noxious* to vegetables, and that this season is *forward* according to the severity of the preceding winter.

FONTANA observed, that during winter the *vipers* which he kept for his experiments were in a *torpid state*, though the thermometer was at 59 degrees. He endeavoured to render them vigorous by *warmth*, and exposed them to a heat of 67 degrees only. *In two minutes they died*, though during *summer* they bear a *much greater degree of heat*, without the *least injury*; but *then* they are *less irritable*.

SPALANZANI observed the *newts* bury themselves in the earth, and become *torpid*, in the month of October, before the thermometer in the shade falls to 54 degrees; and that they *re-appear* in the month of February, though at that time it freezes during every night, and not unfrequently during the day the thermometer is many degrees *below* 54.

“What is the reason,” enquires this excellent observer, “that these animals revive in *spring*, when the cold is

more intense ; and sink into torpidity at a much less degree of cold in the *autumn* ?”

I will solve this problem, by observing that in *autumn* a very great stimulus is required to act upon the fibre of these animals, *exhausted* as it has been by the heat of the summer ; but in *spring*, the least stimulus, the least increase of heat, is sufficient to put the fibre into action, its *irritability* having *accumulated* during winter in consequence of the *absence* of the *common stimuli*.

Thus precisely is it with the *vegetable tribe*, for they *sleep* in winter, and are *awakened* by the vernal sun ; but die, if too powerful a heat be suddenly applied.

On this principle, says the Rev. Mr. Townsend, we may account for the destruction of plants by *blight* in summer ; for unless there be *frost* at night there is no blight ; and it may be remarked, that the blight does not take place during the action of the *frost*, but at the rising of a *cloudless sun*.

Hence it is that our garden crops, such as French beans and peas, which usually suffer most by blight after a frosty night in summer, suffer no injury if they are watered immediately before the rising of the sun, because the evaporation abates the heat.

The effects of winter are therefore very great in cold climates, because the accumulation of the *irritability* is in proportion to the abstraction of the stimulus of heat.

In Lapland corn ripens in 60 days, whereas in France it requires 120 or 160 days. The truth of what is here advanced may be proved by exposing vegetables *alternately* to *heat* and *cold* : it is surprising how much their growth and the power of vegetation is increased. But in these experiments care must be taken to vary the temperature by degrees ; because the *irritability accumulating* in the fibre by the abstraction of the heat, a very small quan-

ity of this stimulus *then* applied is sufficient to exhaust it entirely, or to destroy it.

Of Asphyxia from intense Cold.

We are now to contemplate the effects of the excess of *cold*. When the mad king of Sweden carried on his diabolical wars, oftentimes would his men be found frozen at their posts. But we will consider this subject methodically.

If we look around the world we shall be able to find not more than *six distinct varieties* in the human species, each of which is strongly marked, and speaks the kind seldom to have mixed with the other. The race we are at present about to consider are the men who are found near *the Pole*. These nations being under a rigorous climate, where the productions of nature are but few, and the provisions coarse and unwholesome, their bodies have shrunk to the nature of their food. These, therefore, in general, are described as a race of short stature*, and odd shape, with countenances as savage as their manners are barbarous. Gustavus Adolphus once attempted to form a regiment of such men, but he found it impossible to accomplish his design; for it should seem, says Dr. Goldsmith, as though they were unfitted for any other climate, or mode of life, but their own.

In these inhospitable regions all is *torpid*. Here you see, in the greatest possible perfection, the *sedative power* of extreme and continued cold. Here no vegetable thrives except the *lichen*; and no animal but the *rein-deer*. Nor is the extremity of *cold* less productive of the *tawny* complexion than that of heat. The natives of the *arctic circle* are all *brown*; and those that lie most to the north are of a

* They are usually about four feet high, and the *tallest* does not exceed five feet.—GOLDSMITH.

*still darker hue.** In this manner *both extremes are unfavourable* to the human form and colour, and nearly the same *debilitating effects* are produced under the *Poles* that are observed at the *Line*.

Ah ! little think the gay licentious proud,
 Whom pleasure, power, and affluence surround ;
 They, who their thoughtless hours in giddy mirth,
 And wanton, often cruel, riot waste.
 Ah ! little think they, while they dance along,
 How many feel, this very moment, death
 And all the sad variety of pain.
 How many sink in the devouring flood,
 Or more devouring flame. How many bleed,
 By shameful variance betwixt man and man.
 How many pine in want, and dungeon-glooms ;
 Shut from the common air, and common use
 Of their own limbs. How many drink the cup
 Of baleful grief, or eat the bitter bread
 Of misery. Sore pierced by wintry winds,
 How many shrink into the sordid hut
 Of cheerless poverty.—Perhaps, the swain
 Hieing homeward to his family, now
 Disaster'd stands ; sees other hills ascend,
 Of unknown joyless brow ; and other scenes
 Of horrid prospect, bleach the trackless plain :
 Nor finds the river, nor the forest, hid
 Beneath the formless wild : but wanders on
 From hill to dale, still more and more astray ;
 Impatient flouncing through the drifted heaps,
 Stung with the thoughts of home ; the thoughts of home
 Rush on his nerves, and call their vigour forth
 In many a vain attempt. How sinks his soul !
 What black despair, what horror fills his heart ?
 When for the dusky spot, which fancy feign'd
 His tufted cottage rising through the snow,
 He meets the roughness of the middle-waste,
 Far from the track, and blest abode of man ;
 While round him night resistless closes fast,

And every tempest, howling o'er his head,
 Renders the savage wilderness more wild.
 Then throng the busy shapes into his mind,
 Of cover'd pits, unfathomably deep,
 A dire descent! beyond the power of frost,
 Of faithless bogs; of precipices huge,
 Smoothed up with snow; and, what islands unknown,
 What water, of the still unfrozen spring,
 In the loose marsh or solitary lake,
 Where the fresh fountain from the bottom boils.
 These check his fearful steps;—and down he sinks
 Beneath the shelter of the shapeless drift,
 Thinking o'er all the bitterness of death,
 Mixed with the tender anguish nature shoots
 Thro' the wrung bosom of the dying man,
 His wife, his children, and his friends unseen.—
 In vain for him th' officious wife prepares
 The fire fair blazing, and the vestment warm.
 In vain his little children, peeping out
 Into the mingling storm, demand their sire,
 With tears of artless innocence. Alas!
 Nor wife, nor children, more shall he behold,
 Nor friends, nor sacred home. On every nerve
 The deadly winter seizes; shuts up sense,
 And o'er his inmost vitals creeping cold,
 Lays him along the snows, a stiff'ned corse,
 Stretch'd out, and bleaching in the northern blast.

THOMSON.

When, through exposure to extreme cold, the fingers,
 or other external parts of the human body, are frozen, the
 heat in these parts must necessarily be reduced to the
 lowest point consistent with life. If artificial heat be sud-
 denly applied, a mortification ensues, and the parts that
 have been *frost-bitten* drop off. But if they be thawed by
 friction with snow, and afterwards the gentlest warmth be
 then gradually applied, the parts are soon restored to their
 wonted use and activity.

When the state of torpor, or apparent death, is brought

on, whether in the dormant animals, or man, whether by the sedative effects of cold, or by submersion, the phenomena are extremely similar. *Both* are bereft of SENSE and MOTION. *Both* lose a large portion of ANIMAL HEAT. *Both* on their first recovery exhibit similar efforts towards restoring RESPIRATION and CIRCULATION. *Both* are restored by a *gentle degree* of WARMTH, and are destroyed by a HEAT *too great, or too suddenly applied*. Indeed, the GRAND SECRET of the art of restoring *suspended animation*, consists in NICELY ADJUSTING THE NATURAL AND ARTIFICIAL STIMULI TO THE EXACT TONE OF THE IRRITABLE FIBRE.

If the recovery of the *marmot* is more uniformly certain, it is not only because the torpor is more gradual, but because the degree of heat is regulated by the steady, unerring hand of NATURE; whereas in man, it is governed by the uncertain and often capricious rules of ART.

SECT. V.

The Manner in which Inflammatory Fevers, Rheumatisms, and Colds, are produced.

On going into a *cold bath*, suppose at 33 degrees of heat on Fahrenheit's scale, the action of the capillary arteries of the skin is *diminished*, or ceases for a time. Hence less or no blood passes these capillaries, and paleness succeeds. But soon after emerging from the bath, a more florid colour, and a greater degree of heat, is generated on the skin than was possessed before immersion; for the capillary arteries, after their quiescent state, occasioned by the want of stimulus, become *more irritable* than usual to their natural stimuli, owing to the *accumulation of irritability*, and hence a greater quantity of blood is transmitted through them, and in consequence a greater degree of heat suc-

ceeds. Besides the *quiescence* of the minute vessels of the lungs, there are many other systems of vessels which become torpid from their irritative associations with those of the skin.

From the *quiescence* of such extensive systems of vessels as the capillaries of the skin, and the minute vessels of the lungs, with their various absorbent series, a great *accumulation* of *irritability* is occasioned; part of which is again expended in the increased exertion of all these vessels, with an universal glow of heat in consequence of this exertion, and the remainder of it adds vigour to both the vital and voluntary exertions of the whole day.

If the activity of the subcutaneous vessels, and of those with which their actions are associated, was too great before cold immersion, as in the hot days of summer, by which the *irritable principle* was previously *diminished*, we see the cause why the cold bath gives such present strength; namely, by stopping the unnecessary activity of the subcutaneous vessels, and thus preventing the too great *exhaustion* of the *irritable principle*.

In those constitutions where the degree of *inirritability*, or of debility, is greater than natural, the coldness and paleness of the skin, with the quick and weak pulse, continue a long time after the patient leaves the bath; and the subsequent heat approaches by unequal flushings, and he feels himself disordered for many hours. Hence the bathing in a cold spring of water, where the heat is but 48 degrees of Fahrenheit's thermometer, much disagrees with those of weak or unirritable habits of body; who possess so little of the *irritable principle*, that they cannot, without injury, bear to have it diminished even for a short time; but who can, nevertheless, bear the more temperate coldness of Buxton baths, which is about 80 degrees of heat, and which strengthens them, and makes them, by

habit, less liable to great *quiescence* from small variations of cold, and thence less liable to be disordered by the unavoidable accidents of life. Hence it appears, why people of these inirritable constitutions, which is another expression for a defective irritability, are often much injured by bathing in a cold spring of water; and why they should continue but a very short time in baths, which are colder than their bodies; and should gradually increase both the degree of coldness of the water, and time of their continuance in it, if they would obtain salutary effects from cold immersions.*

One Richard Edwards, of Liverpool, a healthy young man, twenty-eight years of age, with black hair, and a ruddy complexion, went into some fresh water, which was about the temperature of mild weather, viz. about 40 degrees by the thermometer. He continued in this water 34 minutes, and then went into a *warm bath* at 90 degrees.

Here, for the first moments, he felt very warm, but his hands and feet gave him pain, and in two minutes, being still in the warm bath, he was seized with *shiverings*. The water was now increased in heat 6 degrees, but our experimentalist still felt cold; the heat was further increased 10 degrees, and after remaining in the warm bath half an hour, he came out sick and very languid, his pulse was quick and feeble. He passed a very feverish night, and the next day had wandering pains over his body, with great weakness resembling the *incipient stage* of a fever.

Now it can make little difference whether a person pass from *cold air* or *cold water*, into *warm air* or *warm water*; and I have often seen, says Dr. Beddoes, persons who had long been riding in the cold and wet, experience the *first symptoms* of fever upon coming into a *warm room*, sitting

near the fire, and drinking spirits. After riding in the rain until I have been thoroughly soaked, I have always experienced, says he, a glow, as if my skin had been on fire, merely from putting on dry clothes, and the exertion attending the change of dress. At the same time I have felt within my nostrils the dryness and heat that is perceived at the beginning of a cold which, however, I have escaped by keeping *cool* and *quiet* for a time. I have known this exactly to be the case with others; and I have made the observation so often, that I am certain I am right.

A patient lately mentioned to me, says this ingenious physician, among the particulars of her complaint, a circumstance which seems, both on account of its singularity, and the illustration it affords of an *important principle* in animal nature, to be worth recording. Her constitution was one of those where a small irregularity in diet, exposure to cold, &c. produced pain and disorder in the bowels, sometimes arising to a severe fit of the cholic. The patient having one day occasion to wash some butter, conceived that by removing her hands occasionally out of the *cold spring water*, into *warm water*, she should have a better chance of escaping the accustomed complaint in her bowels. She accordingly heated some water as hot as she could well bear it, and from time to time transferred her arms out of the *cold* into the *hot water*, immersing them pretty deep in the latter. It was on a Saturday in spring; the next morning she was awakened by violent pain under each axilla, and was likewise sensible of a considerable swelling under each axilla. The inflammation continued, and by Tuesday morning the tumors had increased to the size of a twopenny loaf each. They soon afterwards broke, and discharged a large quantity of pus. In about a fort-

night both wounds were healed. These circumstances indicate a true *pneumonic inflammation*, which I suppose may be safely ascribed to the *alternate* action of *heat* and *cold*.

Mr. Clarkson, in his Essay on the Impolicy of the African Slave Trade, informs us, that when slaves are brought on board, the seamen, to make room for them, are turned out of their apartments, and sleep, for the most part, on the decks, from the time of their leaving the coast of Africa (where the *days* are *excessively hot*, and the *dews* *excessively cold* and *heavy*) to their arrival at the West India Islands. From this bad lodging, he proceeds, and this continual exposure to *colds* and *damps*, and *suddenly* afterwards to a burning *sun*, *FEVERS* originate, which carry many of them off! This fever attacks the whole frame; but the eye commonly feels the inflammation most. The inflammation of the eyes terminates either in dispersion or suppuration; in the first instance the eyes are saved; in the latter they are lost.

The inflammation of the eye is not the only disease produced in Egypt, by the succession of *hot days* to *cool nights*, where it is the custom to sleep, during the summer, in the open air, any more than on board our slave ships; as the reader will find, upon recurring to Alpinus and the later travellers. In both situations causes and effects run parallel. The well known danger of exposure to *dews* in *hot climates*, and indeed in all climates, in certain cases, seems to depend on the same principle. It is also probable, that the *heat* of the *preceding day* enables the *dews* of the *night* to prepare the system for the *stimulating effects* of the *heat* of the *succeeding day*; so that of two persons who should expose themselves without precaution to the *cold* of the *night*, and the *heat* of the *following day*, he who

should have been most *exhausted* the day before by the *heat*, would, if other circumstances could be rendered alike equal, be most injured by the next alternation.

Thus when any part of the body has been exposed to *cold*, it is liable to be much more affected by heat and other stimuli, than before the exposure. Of this the method of treating *frozen limbs* in cold countries affords a beautiful and decisive proof. Were a frozen limb to be brought before a fire, or immersed in warm water, a violent inflammation would come on, and speedily terminate in mortification. They therefore take *snow* to rub the parts benumbed with cold, and very gradually expose them to a warm temperature. This custom universally obtains in all the northern climates, where the rude inhabitants possess a method of relief that might do credit to the ingenuity of more enlightened nations, and such as is not unworthy of their imitation! The pungent pain felt upon holding an hand, much chilled, to the fire, is another exemplification of the same principle, which seems, says Dr. Beddoes, to be one of the most general laws of animal nature.

Now after the application of cold, which, according to circumstances, produces a greater or smaller diminution of the actions of the living system, and at length sleep itself, there may be an infinite number of gradations between a *fatal inflammation* and a *transitory glow*, and this according as the previous cold and the subsequent heat have varied in intensity ;—but whatever be the degree, the effect depends on the same principle.

By respiring a *cold atmosphere* the same thing happens to the nostrils, fauces, lungs, as to the external surface of the body upon going into a *cold bath* ; and if we pass suddenly from *such an atmosphere* into a *warm room*, what

happens to the skin will, in some degree, happen to the membrane lining these cavities; a *glow* or *inflammation* will ensue, according to the difference between the two temperatures and the length of time passed in the cold.

When the application of cold or moisture to a superficial part only is succeeded by an *inflammation* of the respiratory cavities, the consent of the whole system easily explains this remote local affection. The cause of disease pervades at once, and feels, as it were, or searches the whole body, but affects only in a degree to draw our notice to the organ which from habit or structure is *most tender*. Suppose a person fainting from the heat of a crowded room, a window is thrown open with the door, and many are exposed to a current of cold air, yet *how various* are the disorders produced! Should any other part, from previous circumstances, have been rendered more sensible to its influence, we shall in consequence have either a sore throat, a diarrhœa, a stiff neck, tooth-ache, or the rheumatism, in place of a catarrh.

Children are so susceptible of *inflammation* that a great part of the mortality among them is, as far as I have observed, and can judge, to be ascribed to the ignorance of mothers and nurses of the power which even a moderate change of temperature, if suddenly made, has to affect their tender and irritable frame.

Attentive to this law of the animal economy, the English government send their troops first to Gibraltar, before they pass from a cold climate to the intemperate regions of the West Indies, whereby thousands of lives have been preserved.

<i>Names of the Parents.</i>	<i>L.</i>	<i>D.</i>	<i>Names of the Parents.</i>	<i>L.</i>	<i>D.</i>
Marg. Jones	6	3	Samuel Holyhead....	4	8
Mary Holmes	4	0	George Highway. ...	8	0
Thomas Sandford....	7	4	Constant Richards...	3	0
John Smouch.....	6	6	Mary Walker.....	3	0
Anne Roberts.....	3	0	Edward Evans.....	3	4
E. Felton.....	7	6	Anne Hughes	4	2
E. Jinks	1	6	Jane Ingram	3	1
R. Richards	1	0	John Hammond	4	2
Robert Pigging	7	1	Elizabeth Smith....	3	4
E. Ward	3	2	Mary Richards	2	1
Sarah Colley	4	1	Sarah Richards	6	0
Lucy Clark	3	6	Catherine Harper....	5	0
Elizabeth Higenson ..	4	4	Anne Hutchenson...	4	3
Joseph Sonds.....	3	1	Philip Saunders	4	0
John Holyhead	4	3	Elizabeth Heath....	7	1
Thomas Felton.....	7	2	Mary Ames.....	7	1
Anne Williams.....	7	1	Mary Bagnold	4	0
John Smith.....	5	2	Elizabeth Mansfield..	8	1
Joseph Hutchenson..	4	0	Elizabeth Evans	4	0
J. Ellis	3	3	Anne Horton	3	0
Elizabeth Poignor ..	3	1	Thomas Ingram	3	0
Anne Withington ..	6	4	Joseph Ingram	3	0
Jane Underwood	5	2	Jane Swanwick	5	2
Jane Fields	3	2	John Beeston	4	1
James Ingram.....	2	2	John Bostick	5	0
John Askey	5	0	Joseph Heans	6	3
John Smith.....	2	0			
E. Horton	7	0	55 * Total..	224	99
E. Hollinshead	3	5			

Now, which, think you, is the most likely, that there should be something *wrong* in *our management*? or that *three parts* in *four* of our fellow creatures should, in one of the most airy towns in Great Britain, be doomed una-

* This enquiry was made by Dr. Beddoes, at Shifnal, in Shropshire, where firing is very plentiful and cheap. It was asked of each grown up person there, how many children he had had, and how many were dead? In the first column you have the name of the family; in the next, the number of the children alive; and the third, the number of the children dead. Whenever accurate registers of the mortality of the human species, in climates equally warm, shall be kept, I expect that not half so many infants will be found to die as in Great Britain.

voidably to perish before they come to their full growth, without answering any other purpose than to give trouble and endure pain? If this last be the case, then of all the things in this wide world, the human frame is the worst contrived and executed. And I leave you to judge whether such a supposition stands to reason. If then *our management* of our *children* be *wrong* in any material points, a stop may be put to this *excessive mortality*, for we should have only to find out what these points are, and shape our conduct accordingly. One may with the greater propriety embrace an opportunity of disseminating the knowledge, "how COLDS, INFLAMMATORY FEVERS, and RHEUMATISMS, are caught," as their proximate causes, and the manner in which they are to be got rid of, though in my opinion perfectly ascertained, is far from being generally understood even by the members of the medical profession; and if any person, not belonging to that profession, should suspect this to be a wanton paradoxical assertion, he may find in the case of *opium*, and of the cool treatment of *small-pox*, &c. instances equally striking, where one generation of pathologists passed away after another, without being able, in the case of *opium*,* to perceive the *plainest appearances*, or in that of *small-pox*, to draw the *simplest conclusion*. So servilely imitative an animal is man! so loath to employ his own powers of perception and thought!

The sudden, and sometimes severe, changes of weather to which this climate is subject, are perhaps the most unhappy circumstances attending our situation; and the

* One cannot compare Haller's clear and satisfactory parallel of *wine* and *opium*, published in 1769 (*El. Physiolog.* t. V. p. 610—11) with Cullen's perplexed and hypothetical doctrine of *opium*, and his whole article *sedentia*, published in 1789 (*Mat. Medica*, t. ii. 217, *et seq.* without a sense of humiliation!—Dr. BEDDOES.

pernicious effects of them upon the human constitution are so frequently experienced, that diseases of the breast may be truly considered as endemical among the inhabitants of this island. We frequently find a *cold* and *keen* day succeeded by one as *mild* as spring or *warm* as summer; or, what is still worse, the forenoon accompanied with a *sharp, dry, biting north-east wind*, and the latter part of the day uncommonly *warm*. It is impossible but this sudden change from *cold* to *heat* must, in delicate constitutions especially, be productive of mischief.

When alterations of weather from *cold* to *heat* succeed gradually, those salutary powers of accommodation with which the animal economy is furnished, may prevent any mischief or disorders, though an alteration in the constitution proportioned to that in external nature, must necessarily succeed those changes; but that which might, without inconvenience to the constitution, be produced *gradually*, will, if *too sudden* and *abrupt*, be felt as a disease; as a man may with ease and safety gradually descend a flight of steps, when a sudden jump from them would endanger his life. Thus we bear without injury the *heat* of *spring* after the *coldest winter*, though it must be confessed that disorders take on at that season a more inflammatory appearance.

But where the change is more violent than in the transition from one season to another, as when Europeans go to the East or West Indies, until the constitution becomes accommodated to the climate, the *uncommon heat* to which such persons are exposed, must have a most powerful effect on their irritable frames. Immediately on the arrival of *northern strangers* within the *tropics*, their circulation becomes quicker, their perspiration freer; a lassitude or debility takes place, from the uncommon expense of the irritable principle consumed by the increased

actions of the heart and arteries, and the secretions dependant in a great measure on their movements. In short, the pulse is rendered harder, fuller, and stronger. The skin is redder than usual, but especially that of the face, with other signs of general plethora,* to which the fluids from increased absorption certainly contribute, though it chiefly arises from the increased force of the vascular system. In short, more or less of *fever* is kept up, which varies in different people, according to circumstances, continues for an indeterminate time, or until the increased force of the heart and arteries, kept up by the *accumulated irritability* of the system, from the previous effect of *cold*, ceases, that is, until the right balance between the irritability of the fibre and the external stimuli be properly adjusted.

But if, on the contrary, we pass from a *warm* to a *cold* climate no such evil effects are observed to take place. *Linnæus*, in a paper in the *Amœnitates Academiæ*, expresses his astonishment at the impunity with which the *heated* Laplander rubs himself with *snow*, or even rolls in the *snow*, and drinks the *cold snow water*. We every day see *horses* in a state of the *most profuse perspiration* freely washed with *cold water*, and always *without injury*. I have, says Dr. Beddoes, within these two years, caused horses, accustomed to be stabled, to be turned out in winter; and no cough, catarrh, or other disorder, has ever been the consequence. It appears therefore to me, adds this

* HEAT has the property of *expanding* all bodies: thus a circular piece of iron made exactly to pass through a ring, when heated, will be found too large, and thus the rings on the fingers of those who have passed into warmer climates, will be found, from the increased size of that part of the *body*, too tight. In the *cold fit* of an ague, rings are observed to drop off. But the PLETHORA here spoken of arises from the increased action of the *absorbent*, as well as the *vascular system*.

ingenious physician, that within certain limits, and those not very narrow, the transition from a *higher* to a *lower temperature* is attended with *no danger* to animals in a state of tolerable health; and a person, I conceive, might *suddenly pass* from an *higher* to a *lower temperature* without *inconvenience*, even where the difference is so great as to be capable of producing *considerable inflammation*, if the change should be made with equal celerity in a contrary direction.

It has been before observed, that if you keep *one* of your hands in *cold water* for two minutes; then put *both hands* into *warm water*; and *the hand* which has been in the *cold water* first will feel much the *warmer* of *the two*. Or else, handle some *snow* with *one hand*, while you keep *the other* in *your bosom*, that it may be no colder than the rest of your body; now bring *both* within an *equal distance* of the *fire*, and you will feel *how much more* THE HEAT affects the *cold* than the *warm hand*. This would be a *dangerous experiment* were the hand kept *too long* in the *snow*, or if *the fire* be *too strong*. For, in some countries, where the *cold* is much greater than it ever is in England, it is common for people to have their toes and fingers and ears so *frost-bitten* as to lose all their feeling; and should that person *warm* them at a fire, or put them into *warm water*, a VIOLENT INFLAMMATION is sure to come on, and the part *mortifies*. So they are obliged to set cautiously about bringing the part back to its natural feeling, and they rub it hard with *snow*, by which means they recover it in the gentlest and most gradual manner.

So when a person is out in very *cold weather*, the air, every time he draws his breath, brushes his *nostrils*, *wind-pipe*, and *lungs*; and, just as is the case with the *outward skin*, it makes *these parts more liable to be INFLAMED by HEAT*.

If you attend to what not unfrequently happens in coming out of a *cold moist air* into a *warm room*, you will first perceive a *glow* within your nostrils and breast, as well as all over the surface of your body. Soon afterwards, more especially, if you drink warm or spirituous liquors, a disagreeable dryness, or huskiness, will be felt in the nostrils and breast; by and by a short tickling cough will come on from an increased secretion of the glands, of the nose, fauces, and wind-pipe, which being of a sharp nature, stimulates the glands to a further increase of secretion, which often occasions a very large discharge of sharp mucus. You will perhaps at first shiver a little; this will make you draw nearer the fire, and drink some more brandy and water; but it will be all to no purpose. The more you try to *heat yourself*, the more chilly and uncomfortable will you become, for you have now *caught cold*, that is, you have *brought on* AN INFLAMMATION of the *chilled part*, which is the smooth moist membrane which lines the nostrils, and goes down the wind-pipe into the lungs.

I have sometimes been able to make other persons, says Dr. Beddoes, attentive to the progress of these phenomena, and nothing has appeared more evident, than that during exposure to *wet* and *cold* no tendency to INFLAMMATION is perceptible, but that *subsequent heat, exercise* in the dry, and *stimulants*, produce the *glow* OF INFLAMMATION.

By keeping *quiet* and *cool* for some time after being *wet* in summer, and by avoiding a *sudden transition* into a *warm temperature* in *cold weather*, and by *temperance*, with regard to diet, (rather *abstemiousness*), in *both cases*, those INFLAMMATORY DISEASES, for which *cold* only *prepare the system*, may be easily avoided; and any person, by acting upon these *principles*, may have, at

pleasure, a *slight* or a *violent catarrh*, or probably *no catarrh at all*.*

The *popular treatment*, therefore, of *colds* during their early stage, is just as prejudicial as the ancient *hot regimen* during the SMALL POX. White wine whey, buttered ale, increased clothing, getting drunk, &c. *originated* from the supposition, that *colds* proceeded from *obstructed perspiration*, whereas it is found, from the very accurate experiments of Sanctorius, and our countryman Dr. Keil, that *the perspiration* is at that time *as abundant* as at any other. It has *continued*, because the faculty were, till of late, unapprised of *the nature of colds*, and from partial success in this dangerous practice, as *perspiration*, when produced, carries off *superabundant heat*. For the fluid that escapes from the body consists chiefly of watery moisture, which, uniting with a large portion of sensible heat, is carried off in the form of steam. Hence the more speedy the evapo-

* This important improvement for the prevention and cure of *catarrh* was among the early discoveries of Dr. John Brown. He laboured under a most severe cold and hoarseness. Among the symptoms he felt an increased sensibility to cold. He knew not what to think of this fact. In this uncertainty he gratified his feelings, and in a warm season of the year shut out every avenue that could let in air, and put on an additional garment. He ate full meals of animal food, and took some warm brandy and water after supper in a moderate proportion. He did not debar himself from exercise in the middle of the day, but while under this plan of treatment, he perceived his hoarseness and cold manifestly to increase. He had besides every day to lecture to his class, and now scarcely could be heard, and speaking was a great labour. He began at last to perceive, that stimulants aggravated his disorder, and without hesitation began an opposite course of management. He therefore forsook a warm room, let the air play around him, confined his diet to vegetable aliment, chiefly ate water-gruel, abstained from strong drinks, and substituted in their room plenty of barley-water. The result was, that a cold that had remained several weeks was cured in a few days. "I afterwards," says he, "had occasion to try the same management on myself, and others, and always experienced the same effect."

ration the more sudden is the diminution of heat: or, in more familiar terms, the greater is the degree of cold thus generated in the constitution. Hence *the heaping on of STIMULI* in a disease demanding *an opposite treatment*, has oftentimes done good, but it is to be feared, it *has not unfrequently done harm*; whereas the treatment here laid down is both *safe and effectual*.

SECT. VI.

Of Hunger.

As the narrative of the sufferings of Captain Bligh and his crew to the South Seas, for the purpose of conveying the BREAD-TREE to the *West Indies*, and his *sufferings* and *preservation*, are very interesting, and appertain to the subject of this section, it is presumed, that a detail of them will not be found unacceptable to that class of readers for whom this work is compiled, who wish to find the agreeable blended with the useful. They are therefore recorded at greater length than some other classes of readers will perhaps approve of.

The king having been graciously pleased to comply with a request from the merchants and planters interested in his Majesty's *West India Possessions*, that the BREAD-FRUIT TREE* might be introduced into those islands, a vessel, proper for the undertaking, was bought, and taken into dock at *Deptford*, to be provided with the necessary fixtures and preparations for executing the object of the voyage.

* In the *Society Islands* the BREAD-FRUIT grows on a tree, which is the size of a middling oak; its leaves are frequently about a foot and a half long, of an oblong shape, deeply sinuated like those of the fig-tree, which they resemble in colour, and in the exuding of a white milky juice upon being broken. *The fruit is about the size and shape of a child's head.* The

Every thing seemed prosperous, when a *mutiny* took place, and Captain Bligh, and part of his crew, were thrust into a boat to perish.

“ My mind,” says Capt. Bligh, “ was now busily employed in considering what was best to be done, when I was solicited by all hands to take them towards home: and when I told them that no hopes of relief remained for us (except what might be found at New Holland) till I came to Timor, a distance of full 1200 leagues, where there was a Dutch settlement, but in what part of the island I knew not,—to effect which, they all agreed to live on *one ounce of bread, and a quarter of a pint of water per day*. Therefore, after examining our stock of provisions, and recommending to them, in the most solemn manner, not to depart from their promise, we bore away across a sea, where the navigation is but little known, in a small boat, twenty-three feet long from stem to stern, deeply laden with *eighteen men*. I was happy, however, to see that every one seemed better satisfied with our situation than myself.

“ Our stock of provisions consisted of about one hundred and fifty pounds of bread, twenty-eight gallons of water, twenty pounds of pork, three bottles of wine, and five quarts of rum. A few cocoa-nuts were in the boat,

eatable part lies between the skin and the core ; it is as *white as snow*, and somewhat of the consistence of new bread. It serves as the principal food to the inhabitants of these islands, to procure which costs them nothing but the labour of climbing the tree. This tree, however, does not shoot up spontaneously ; but if a man plants ten in his life time, which he may do in about an hour, he will as completely fulfil his duty to his own and future generations, as the native of our less temperate climate can do by ploughing in the cold winter, and reaping in the summer's heat, as often as these seasons return, even if, after he has procured bread for his present household, he should convert a surplus into money, and lay it up for his children. FROM CAPTAIN COOK'S *Voyage*.

and some bread-fruit, but the latter was trampled to pieces.

“ It was about eight o'clock at night when we bore away under a reefed lug fore-sail: and, having divided the people into watches, and got the boat in a little order, we returned God thanks for our miraculous preservation, and, fully confident of his gracious support, I found my mind more at ease than it had been for some time past.

“ At day-break the gale increased; the sun rose very fiery and red, a sure indication of a severe gale of wind. At eight it blew a violent storm, and the sea ran very high, so that between the seas the sail was becalmed, and when on the top of the sea it was too much to have set; but we could not venture to take in the sail, for we were in very imminent danger and distress; the sea curled over the stern of the boat, which obliged us to bale with all our might. A situation more distressing has, perhaps, seldom been experienced.

“ Our bread was in bags, and likely to be spoiled by the wet: to be starved to death was inevitable, if this could not be prevented. Fortunately for us we had on board the carpenter's chest, the tools of which we stowed at the bottom of the boat, and it became a fit place to secure this article.

“ I served a *tea spoonful* of rum to each person (for we were very wet and cold), with a quarter of a bread-fruit, which was scarce eatable, for dinner:—our engagement was now strictly to be carried into execution, and I was fully determined to make our provisions last eight weeks, let the daily proportion be ever so small.

“ The weather continued very severe. The sea ran higher than in the forenoon, and the fatigue of baling, to keep the boat from filling, was exceedingly great. But among the hardships we were to undergo, that of being

constantly wet was not the least: the night was very cold, and at day-light our limbs were so benumbed, that we could scarce find the use of them. At this time I served a *tea-spoonful of rum* to each person, FROM WHICH WE ALL FOUND GREAT BENEFIT!

“ Monday, May 4, 1777.—I divided five small cocoanuts for our dinner, and every one seemed satisfied. Served for supper a few broken pieces of bread-fruit, and performed prayers.

“ The night turned out fair, and, having had tolerable rest, every one seemed considerably better in the morning, and contentedly breakfasted on a few pieces of yams that were found in the boat. After breakfast we examined our bread, a great deal of which was damaged and rotten; this, nevertheless, we were glad to keep for use.

“ For dinner, I served some of the damaged bread, and a quarter of a pint of water.

“ Wednesday, May 6.—We discovered several small islands. Those we were near appeared fruitful and hilly, some very mountainous, and all of a great height. I durst not, however, venture to land, as we had no arms, and were less capable of defending ourselves than we were at Tofoa.

“ Our allowance for the day was a quarter of a pint of cocoa-nut milk, and the meat which did not exceed two ounces to each person: it was received very contentedly, but we suffered great drought.

“ To our great joy we hooked a fish, but we were miserably disappointed by its being lost in trying to get it into the boat.

“ I directed the course W. by N. for the night, and served to each person an ounce of the damaged bread, and a quarter of a pint of water, for supper.

“ As our lodgings were very miserable, and confined for

want of room, I endeavoured to remedy the latter defect, by putting ourselves to watch and watch : so that one half always sat up while the other lay down on the boat's bottom, or upon a chest exposed to the open air.

“ Our limbs were dreadfully cramped, for we could not stretch them out ; and the nights were so cold, and we so constantly wet, that, after a few hours sleep, we could scarce move.

“ Thursday, May 7.—At dawn of day we discovered land. The country appeared to be agreeably interspersed with high and low land, and in some places covered with wood. Being very wet and cold, I served a spoonful of rum and a morsel of bread for breakfast.

At four o'clock there was much thunder and lightning, and heavy rain, when every person did his utmost to catch some water, and we increased our stock to 34 gallons, besides quenching our thirst for the first time since we had been at sea ; but we passed the night very miserably, for being extremely wet, and having no dry things to shift or cover us, we experienced cold and shiverings scarce to be conceived.

“ Friday, May 8.—The allowance I issued to day, was an ounce and a half of pork, a *tea-spoonful* of rum, half a pint of cocoa nut milk, and an ounce of bread. *The rum, though so small in quantity, was of the greatest service !* For supper I served a quarter of a pint of water, and half an ounce of bread. I endeavoured to amuse my people by describing the situation of New Guinea and New Holland, and gave them every information in my power, that in case any accident should happen to me, those who survived might have some idea of what they were about, and be able to find their way to Timor, which at present they knew nothing of but the name.

“ Saturday, May 9.—In the morning, a quarter of a pint

of cocoa-nut milk, and some of the decayed bread, was served for breakfast; and for dinner I divided the meat of four cocoa-nuts, with the remainder of the rotten bread, which was only eatable by such distressed people. The wind had been moderate all day, in the S. E. quarter, with fine weather; but, about nine o'clock in the evening, the clouds began to gather, and we had a prodigious fall of rain, with severe thunder and lightning. Being miserably wet and cold, I served to the people a *tea-spoonful* of rum each, to enable them to bear their distressed situation. The weather continued extremely bad, and the wind increased; we spent a very miserable night, without sleep, except such as could be got in the midst of rain.

“Sunday, May 10.—The day brought no relief but its light. The sea broke over us so much, that two men were constantly baling; and we had no choice how to steer, being obliged to keep before the waves for fear of the boat filling.

“The *allowance* now regularly served to each person, was *one 25th of a pound of bread, and a quarter of a pint of water, at eight in the morning, at noon, and at sun-set.*

“To-day I gave about half an ounce of pork for dinner, which, though any one would have considered only as a mouthful, was divided into several pieces, and was eat with great slowness.

“A fishing line was generally towing from the stern of the boat, but though we saw great numbers of fish, we could never catch one.

“The rain abated towards noon, but the wind continued very strong, with very squally weather, and a high breaking sea, so that we were miserably wet, and suffered great cold in the night.

“Monday, May 11.—In the morning, at day-break, I served to every person a *tea-spoonful* of rum, our limbs

being so cramped that we could scarce move them. Our situation was now extremely dangerous, the sea frequently running over our stern, which kept us baling with all our strength. In the evening it rained hard, and we again experienced a dreadful night.

“Tuesday, May 12.—At length the day came, and shewed to me a miserable set of beings, full of wants, without any thing to relieve them.

“Some complained of great pain in the bowels, and every one of having almost lost the entire use of his limbs.

“The little sleep we got was no ways refreshing, as we were covered with sea and rain.

“I served a *spoonful* of rum at day-dawn, and measured out the 25th of a pound of bread, and a quarter of a pint of water, as yesterday.

“The wet weather continued, and in the afternoon the wind came from the southward, blowing fresh in squalls. As there was no prospect of getting our clothes dried, I recommended to every one to strip, and wring them through the salt water, by which means they received a warmth which, when wet with rain, they had not.

“Wednesday, May 13.—I thought it prudent to keep back the allowance of rum at day-break. All this day we were constantly shipping water, and baling, and suffered much cold and shiverings in the night.

“Thursday, May 14.—Fresh gales at S. E. and gloomy weather, with rain, and a high sea. At six in the morning we saw land, which soon appeared to be four islands, one of them larger than the others, and all them high, and remarkable in appearance.*

“Friday May 15.—At one in the morning another

* These were new discoveries.

island was discovered. A number of grunnets, boobies, and men of war birds, were seen. These islands lie between the latitude $13^{\circ} 16'$, and $14^{\circ} 10' S.$; their longitude, according to my reckoning, $15^{\circ} 51'$ to $17^{\circ} 6' W.$ from the island Tofoa; that is, $167^{\circ} 17' E.$ to $168^{\circ} 34' E.$ from Greenwich. The largest island I judged to be about twenty leagues in circuit, the others five or six. The easternmost is the smallest island, and most remarkable, having a high sugar-loaf hill. They are fertile, and inhabited, as I saw smoke in several places.

“ The sight of these islands served only to increase the misery of our situation. We were very little better than starving, with plenty in view; yet, to attempt procuring any relief was attended with so much danger, that prolonging life, even in the midst of misery, was thought preferable, while there remained hopes of being able to surmount our hardships.

“ The wind was at S. E. with rainy weather all day. The night was very dark, not a star could be seen to steer by, and the sea broke continually over us.

“ Saturday, May 16.—In addition to our miserable allowance of one 25th of a pound of bread, and a quarter of a pint of water, I issued for dinner about an ounce of salt pork to each person. I was often solicited for this pork, but I considered it more proper to issue it in small quantities, than to suffer it to be all used at once or twice, which would have been done if I had allowed it.

“ The sun breaking through the clouds, gave us hopes of drying our wet clothes; but the sunshine was of short duration. We had strong breezes at S.E. by S. and dark gloomy weather, with storms of thunder, lightning, and rain. The night was truly horrible, and not a star to be seen; so that our steerage was uncertain.

“ Sunday, May 17.—At dawn of day I found every person complaining, and some of them solicited *extra allowance*; which I positively refused. The night was dark and dismal; the sea constantly breaking over us, and nothing but the wind and waves to direct our steerage. *The little rum we had was of great service*; for when our nights were particularly distressing, I generally served a *tea-spoonful* or *two* to each person; and it was always *joyful tidings* when they heard of my intentions.

“ Monday, May 18.—In the morning the rain abated. The customary allowance of one 25th of a pound of bread, and a quarter of a pint of water, was served at breakfast, dinner, and supper. In the night we had very severe lightning, with heavy rains; and were obliged to keep baling without intermission.

“ Tuesday, May 19.—Very bad weather and constant rain. With the allowance of bread and water, served half an ounce of pork to each person for dinner.

“ Wednesday, May 20.—Fresh breezes, with constant rain; at times a deluge. Always baling. At dawn of day, some of my people seemed half dead; our appearances were horrible; and I could look no way but I caught the eye of some one in distress. *Extreme hunger* was now too evident, but no one suffered from thirst. The little sleep we got was in the midst of water, and we constantly awoke with severe cramps and pain in our bones. This morning I served about *two tea-spoonfuls* of *rum* to each person, and the allowance of bread and water, as usual. All the afternoon we were so covered with rain and salt water, that we could scarcely see. We suffered extreme cold, and every one dreaded the approach of night. Sleep, though we longed for it, *afforded no relief*; for my own part, *I almost lived without it*. About two o'clock in the

morning we were overwhelmed with a deluge of rain. It fell so heavy that we were afraid it would fill the boat, and were obliged to bale with all our might.

“ Thursday, May 21.—At dawn of day I served a *larger allowance of rum*. Towards noon the rain abated, and the sun shone; but we were miserably cold and wet, the sea breaking constantly over us; so that, notwithstanding the heavy rain, we had not been able to add to our stock of fresh water.

“ Friday, May 22.—Our situation this day was extremely calamitous. We were obliged to take the course of the sea, running right before it, and watching with the utmost care, as the least error in the helm would, in a moment, have been our destruction. At noon it blew very hard, and the foam of the sea kept running over our stern and quarters. The misery we suffered this night exceeded the preceding. The sea flew over us with great force, and kept us baling with horror and anxiety.

“ Saturday, May 23.—At dawn of day I found every one in a most distressed condition, and I began to fear that another such night would put an end to the lives of several, who seemed no longer able to support their sufferings.

“ I served an allowance of *two tea spoonfuls of rum*, after drinking which, having wrung our clothes, and taken our breakfast of bread and water, we became a little refreshed.

“ Sunday, May 24.—With the usual allowance of bread and water for dinner, I served an ounce of pork to each person. This afternoon we had many birds about us, which are never seen far from land, such as *boobies* and *noddies*. As the sun, for the first time for fifteen days, shone bright, and the sea was calmed, so that we shipped

but little water, I took the opportunity to examine into the state of our bread, and found that, according to the present mode of issuing, there was a sufficient quantity remaining for 29 days allowance; by which time I hoped we should be able to reach Timor. But as this was uncertain, I determined to proportion the allowance so as to make our stock hold out six weeks.

“ I was apprehensive that this would be ill received, and that it would require my utmost resolution to enforce it; for, small as the quantity was which I intended to take away, for our future good, yet it might appear to my people like robbing them of life; and some, who were less patient than their companions, I expected would very ill brook it. However, on my representing the necessity of guarding against delays that might be occasioned in our voyage by contrary winds, or other causes, and promising to enlarge upon the allowance as we got on, they cheerfully agreed to my proposal. It was accordingly settled, that every person should receive one 25th of a pound of bread for breakfast, and the same quantity for dinner; so that by omitting the proportion for supper, we had 43 days allowance.

“ Monday, May 25.—At noon some *noddies* came so near to us, that one of them was *caught* by the hand. This bird was the size of a pigeon. I divided it, with its entrails, into 18 portions, and it was distributed with the allowance of bread and water for dinner, and we eat up bones and all, with salt water for sauce. In the evening, several *boobies* flying near to us, we had the good fortune to *catch* one of them. This bird is as large as a duck; like the noddy, it has received its name from seamen, for suffering itself to be caught on the masts and yards of ships. I directed the bird to be killed for supper, and the

body, with the entrails, beak, and feet, I divided into 18 shares, and with an allowance of bread, considering all circumstances, we seemed to make a tolerable supper.

“ Tuesday, May 26.—Fresh breezes from the S.E. with fine weather. In the morning we caught another booby, so that PROVIDENCE appeared to be relieving our wants in an extraordinary manner. My people were overjoyed at the addition to their dinner, which was distributed in the same manner as on the preceding evening, *Who shall have this?*

“ The weather was now serene, which, nevertheless, was not without its inconveniences, for we began to feel distress of a different kind from that which we had lately been accustomed to suffer. The heat of the sun occasioned several of our people to be seized with such languor and faintness, that life seemed intolerable. We complained all of dizziness in the head, great weakness of the joints, and violent tenesmus; most of us having had no evacuation* by stool since we left the ship. I had constantly a severe pain in my stomach; but none of our complaints were alarming: on the contrary, every one retained marks of strength, that, with a mind possessed of a tolerable share of fortitude, seemed able to bear still greater fatigue.

“ May 29.—We reached the coast of New Holland, and the joy of my men at the prospect of finding something on the shore was excessive. We returned GOD thanks for his gracious protection, and with much content took our miserable allowance of a 25th of a pound of bread, and a quarter of a pint of water, for dinner.

* It was so in the case of Betsy Canning, who being confined, because she would not prostitute herself, three weeks in a loft by a gipsey woman, lived during that time upon a crust of bread and a small pitcher of water, and escaped in a most wretched condition. Other circumstances also confirm the truth of her story.

“ As there were no appearances to make me imagine any of the natives were near us, I sent out parties in search of supplies, while others of the people were putting the boat in order, that we might be ready to go to sea in case any unforeseen cause should make it necessary.

“ The parties returned, highly rejoiced at having found plenty of oysters and fresh water. They had made a fire by the help of a small magnifying-glass; and what was still more fortunate, we found, among the few things which had been thrown into the boat and saved, a piece of brimstone and a tinder-box, so that I secured fire for the future.

“ *The symptoms of having eat too much began to frighten some of us; but on questioning others, who had taken a more moderate allowance, their minds were a little quieted. The others, however, became equally alarmed in their turn, dreading that such symptoms (which resembled intoxication*) would come on, and that they were all poisoned, so that they regarded each other with the strongest marks of apprehension, uncertain what would be the issue of their imprudence. Fortunately, the fruits we obtained here proved wholesome and good, of which I was soon persuaded when I saw the birds eat them without experiencing any hurt.*

“ Saturday, May 30.—In the morning I discovered a visible alteration in our company for the better, and I sent them away again to gather oysters. We had thirty-eight days allowance, according to the last mode of issuing the 25th of a pound at breakfast and at dinner, and two pounds of pork left. This article, which I did not keep under lock and key as I did the bread, had been pilfered by some inconsiderate person, but every one denied having any

* This is a strong evidence of accumulated irritability in the fibre.

knowledge of this act; I therefore resolved to put it out of their power for the future, by sharing what remained for our dinner.

“ While the party was out picking up oysters, I got the boat in readiness for sea, and filled all our water-vessels, which amounted to nearly 60 gallons. On this occasion, fatigue and weakness so far got the better of their sense of duty, that some of the people expressed their discontent at having worked harder than their companions, and declared that they would rather be without their dinner than go in search of it. One person, in particular, went so far as to tell me, with a mutinous look, that ‘he was as good a man as myself.’ It was not possible for me to judge where this might have an end, if not stopped in time: therefore, to prevent such disputes in future, I determined either to preserve my command, or die in the attempt: and, seizing a cutlass, I ordered him to take hold of another and defend himself; on which he called out I was going to kill him, and humbly implored forgiveness. I did not allow this to interfere further with the harmony of the boat’s crew, and every thing soon became quiet.

“ June 1.—Nelson, who had been out with others in search of provisions, was obliged to be brought back, supported by two men. His complaint was a violent heat in his bowels, a loss of sight, much drought, and an almost total inability to walk. This I found was occasioned by his being unable to support the heat of the sun, and his attempting to do more than his strength was equal to. It was now that the little wine, which I had so carefully saved, became of real use. I gave it in very small quantities, with some pieces of bread soaked in it: and he soon began to recover. The boatswain and carpenter also were

ill, and complained of head-ache, and sickness of the stomach.

“ Towards evening I cautioned every one against making too large a fire, or suffering it after dark to blaze up. Mr. Samuel had the superintendence of this business, while I was strolling about the beach to observe if I thought it could be seen from the main. I was just satisfied that it could not, when on a sudden the whole country appeared in a blaze, that might have been discerned at a much more considerable distance. I ran to learn the cause, found that it was occasioned by the obstinacy and imprudence of one of the party, who, in my absence, had insisted on increasing the fire, in doing which the flames caught the neighbouring grass, and rapidly spread. This misconduct might have produced very serious consequences, by discovering our situation to the natives; for, if they had attacked us, we had neither arms nor strength to oppose an enemy. Thus the relief which I expected from a little sleep on shore was totally lost, and I anxiously waited for the flowing of the tide, that we might proceed to sea.

“ We had now remained just six days on the coast of New Holland, where we found oysters, a few clams, some small fruits, birds,* and water. But perhaps a benefit nearly equal to this we received, by having been relieved from the irksomeness of being constantly in a crowded boat, and by obtaining good rest at night.

“ These advantages certainly preserved our lives; and, small as the supply was, I am very sensible how much it alleviated our distresses. By this time nature would have sunk under the extremes of hunger and fatigue.

* Robert Lamb, when he came to Java, acknowledged, that in one of the foraging parties, he had separated from his companions, and had eat nine birds raw, which he had caught.

Some would have ceased to struggle for a life that only promised wretchedness and misery; and others, though possessed of more bodily strength, must soon have followed their unfortunate companions. Even in our present situation, we were most deplorable objects; but the hopes of a speedy relief kept up our spirits. I was secretly surprised to see that my men seemed as if they had embarked on a voyage to Timor in a vessel calculated for safety and convenience. So much *confidence* gave me great pleasure, and I may venture to assert; that to *this cause* our preservation is chiefly to be attributed. For my own part, incredible as it may appear, I FELT NEITHER EXTREME HUNGER NOR THIRST. My allowance contented me, knowing that I could have no more.

“ June 4.—We were now launched into the open ocean, and I served one 25th of a pound of bread, and an allowance of water, for breakfast, and the same for dinner, with an addition of six oysters to each person.

“ June 5.—Six oysters were, as yesterday, served to each man, in addition to the usual allowance of bread and water. In the evening, a few boobies came about us, one of which I caught with my hand. With the allowance of bread I served a quarter of a pint of water for supper, and to some, who were most in need, half a pint. In the course of the night, being constantly wet with the sea, we suffered much cold and shiverings.

“ June 6.—At day-light I found that some of the clams, which had been hung up to dry for sea store, were stolen; but every one solemnly denied having any knowledge of it. In the afternoon I took an opportunity of examining our store of bread, and found remaining 19 days allowance, at the former rate of serving one 25th of a pound three times a day: therefore, as I saw every prospect of a quick passage, I again ventured to grant an allowance for

supper, agreeable to my promise at the time it was discontinued.

“ June 7.—We had passed the night miserably wet and cold, and in the morning I heard nothing but heavy complaints. The sea was high and breaking over us. I could only afford the allowance of bread and water for breakfast; but for dinner I gave out an ounce of dried clams to each person, which was all that remained. The sea ran very high all this day, and we had frequent showers of rain, so that we were continually wet, and suffered much cold in the night.

“ Mr. Ledward, the surgeon, and Lawrence Labogue, an old hardy seaman, appeared to be giving way very fast. I could only assist them by a tea-spoonful or two of wine, which I had carefully saved, expecting such a melancholy necessity.

“ At four in the afternoon we caught a small dolphin, which was the first relief of the kind that we obtained. I issued out two ounces to each person, including the offals, and saved the remainder for dinner the next day.

“ Towards evening the wind freshened, and it blew strong all night, so that we shipped much water, and suffered greatly from the wet and cold.

“ June 9.—At day-light, as usual, I heard much complaining, which my own feelings convinced me was too well founded. I served the usual allowance of bread and water, and at noon we dined on the remains of the dolphin, which amounted to an ounce per man. This afternoon I suffered great sickness from having the stomach of the fish, which had fallen to my share at dinner. At sun-set I served an allowance of bread and water for supper.

“ June 10.—In the morning, after a very comfortless

night, there was a visible alteration for the worse in many of the people, which gave me great apprehensions.

“ *An extreme weakness, swelled legs, hollow and ghastly countenances, A MORE THAN COMMON INCLINATION TO SLEEP, with an apparent debility of understanding, seemed the melancholy presages of approaching dissolution.*

“ The surgeon and Labogue, in particular, were most miserable objects. I occasionally gave them a few *teaspoonfuls of wine*, out of the little that remained, which greatly assisted them. Gannets, boobies, men of war birds, were constantly about us. I encouraged the men with the hopes of a very few days longer, at the present fine rate of sailing, and we should reach Timor. This expectation was our principal support.

“ June 11.—Every one received the accustomed allowance of bread and water, and an extra allowance of water was given to those who were most in need. In the afternoon we saw gannets, and many other birds, and at sunset we kept a very anxious look out. In the evening we caught a booby, which I reserved for our dinner the next day.

“ Friday, June 12.—At three in the morning, with an excess of joy, we discovered TIMOR, bearing W. N. W.

“ It is not possible for me to describe the pleasure which the blessing of the sight of this land diffused among us. It appeared scarce credible to ourselves, that in an open boat, and so poorly provided, we should have been able to reach the coast of Timor in 41 days after leaving Tofoa, having in that time run, by our log, a distance of *three thousand, six hundred, and eighteen miles*; and that, notwithstanding our extreme distress, no one should have perished in the voyage.

“ The day gave us a most agreeable prospect of the land, which was interspersed with woods and lawns; the

interior part mountainous, but the shore low. Towards noon the coast became higher, with some remarkable headlands. We were much delighted with the general look of the country, which exhibited many cultivated spots and beautiful situations; but we could only see a few small huts, whence I concluded that no European resided in this part of the island. Much sea ran on the shore, which made landing impracticable.

“ June 13.—Not perceiving any sign of settlement, we bore away to the westward, steering along shore. We had a view of a beautiful looking country, as if formed by art into lawns and parks. At two o'clock, having run through a very dangerous breaking sea, the cause of which I attributed to a strong tide setting to windward, and shoal water, we discovered a spacious bay or sound, with a fair entrance about two or three miles wide. I came to a grapnel near the east side of the entrance, in a small sandy bay, where we saw a hut, a dog, and some cattle; and I immediately sent the boatswain and gunner away to the hut, to discover the inhabitants.

“ They returned with five Indians, and informed me that they had found two black families, where the women treated them with European politeness. They brought us a few pieces of dried turtle, and some ears of Indian corn, and offered to fetch us some other refreshments if I would wait; but we determined to push on.

“ We kept close to the east shore under all our sail; but, as night came on, the wind died away, and we were obliged to try at the oars, which I was surprised to see we could use with some effect.

“ Sunday, June 14.—At one o'clock in the morning, after the most happy and sweet sleep that ever men enjoyed, we weighed, and continued to keep the east shore. The report of two cannon that were fired in the morning

early gave new life to every one. We soon after discovered two square-rigged vessels and a cutter at anchor to the eastward. We endeavoured to work to windward, but were obliged to take to our oars again, having lost ground on each tack. At day-light we landed amidst a crowd of Indians, and were agreeably surprised to meet with an English sailor, who belonged to one of the vessels in the road.

“ The abilities of a painter, perhaps, could seldom have been displayed to more advantage, than in the delineation of the *two groups* of figures, which at this time presented themselves to each other. An indifferent spectator would have been at a loss which most to admire, the eyes of famine sparkling at immediate relief, or the horror of their preservers at the sight of so many spectres, whose ghastly countenances, if the cause had been unknown, would rather have excited terror than pity. Our bodies were nothing but skin and bones, our limbs were full of sores, and we were clothed in rags; in this squalid condition, with the tears of joy and gratitude flowing down our cheeks, the people of Timor beheld us, with a mixed sensation of horror, surprise, and pity.

“ They ran with eagerness to procure a surgeon to dress our wounds, to get apparel to cover our nakedness, and a place suitable for our reception. The governor, who was dying of an incurable disease, even hastened from his bed to welcome our arrival. People ran with chairs, tables, benches, and bedding, to an empty house that was assigned us. A plentiful dinner was soon laid before us; but for my own part I felt no extraordinary inclination to eat or drink. My mind kept musing on the mercy of ALMIGHTY God, who had made me the instrument of saving eighteen lives; and as I reflected how providentially we escaped at Tofoa, by the Indians delaying their attack; and that, with

not more provisions than might have been consumed in five days, we crossed a sea of more than twelve hundred leagues, without shelter from the inclemency of the weather; that in an open boat, with so much stormy weather, we escaped foundering; that not any of us were taken off by disease; that we had the great good fortune to pass the unfriendly natives of other countries without accident, and at last happily to meet with the most friendly and best people to relieve our distresses;—I say, when I reflected on all these wonderful escapes, the remembrance of such great mercies enables me to bear, with resignation and cheerfulness, the failure of an expedition, the success of which I had so much at heart, and which was frustrated at a time when I was congratulating myself on the fairest prospect of being able to complete it in a manner that would fully have answered the intention of his Majesty, and the humane promoters of so benevolent a plan.”

That the state of Captain Bligh and his company was that of ACCUMULATED IRRITABILITY, is strongly pointed out.

1st. From *one tea-spoonful* of *rum* producing on these poor men, benumbed as they were with cold, as much effect as *twenty times* the quantity would have had on those who are warm and well fed. And indeed had it not been for the spirits having such a power to act upon men in their condition, they never could have survived the hardships they experienced.

2dly. From the berries found in *New Holland* producing symptoms of *intoxication*, which would not have arisen under any other circumstances.

3dly. By the general *want of sleep* at first, and that which was obtained not refreshing; but, as with extreme cold, when the accumulation of irritability was such as to

threaten the extinction of life, "I observed," says this gallant officer, "a more than common propensity to sleep."

In the last campaign in India, when the Marquis Cornwallis was in possession of Tippoo Sultan's palace, and his gardens, at Bangalore, and was preparing to drive him from his capital, the indignant sultan expressed his ineffectual rage, by the continual fire of cannon on our troops. As this display of his wrath could effect little, he came to Lieutenants Chalmers and Nash, with the welcome tidings of an intended release, and requested them to take two letters on the subject of peace, which he said he had been very anxious to obtain ever since the commencement of the war. He presented them with two shawls each, and five hundred rupees, and ordered horses and attendants to go with them to the camp. He had at this very time concerted a scheme to destroy the commander-in-chief of our forces, whom he thought, by this expedient, to lull into a treacherous security. As our allies, the Nizams, had their army stationed at some small distance from ours, he ordered a party of horse to steal between the two armies, which affecting to belong to the Nizam, asked our picquets for the *Burra Said*, or chief. Not suspecting them to be enemies, they pointed to his tent. These horsemen galloped immediately towards the tent, and having drawn their swords, cut down several lascars and people in their rout. A party of sepoy having turned out with alacrity, their progress was soon stopt. Some shots were fired at them as they retreated, but they got off however, having sustained very little loss.

"This scheme," says Major Diram, "was one of those daring objects that have been so frequently practised by the native powers against each other in effecting revolu-

tions in the East; and had these assassins been conducted by a guide, or their judgment been equal to their spirit in the attempt, it is possible they might have effected their murderous project. But the Mahomedan *horse*, when sent upon such services, are kept *fasting*, and then intoxicated with *bang*, a plant mixed with their tobacco, of which they take a large dose before they enter upon so hazardous an enterprise. This inebriation renders their exertions so wild and disunited, that it is almost impossible for them ever to prove successful against a vigilant enemy.

It was thus in former days, when the Jesuits wanted any desperate act of wickedness to be done, having pitched upon their man, they would shut him up in a large chamber lighted with a small taper no bigger than one's little finger, and hung with black cloth, on which were painted hell flames and devils, and all manner of terrible shapes. This was called the chamber of meditation; and here the person was kept meditating and *fasting* for twenty-four hours; he was then worked up to the pitch at which his employers wanted him, by an *intoxicating draught*; and, shocking as it is to tell, it is nevertheless true, that the errand on which he was sometimes sent after this preparation was MURDER.

Hippocrates has very justly observed, that *children* (who possess abundant irritability), are more affected by abstinence than young persons; *these* more than the middle aged; and the *middle aged* more than old men.

Agreeable to this aphorism, Dante is said, by his countryman Morgagni, to have framed the incidents in the affecting story of Count Ugolino, a nobleman of Pisa, who was confined, with his four sons, in the dungeon of a tower; the key of which being cast into the river Arno, they were in this horrible situation starved to death.

And they are represented by the poet, as dying at different periods, according to their respective ages.

Now the fourth morning rose ; the youngest child—
 Fell at his father's feet, in accent wild,
 Struggling with pain, with his last fleeting breath,
 “ *Help me, my sire,*” he cried, and sunk in death.
 He saw the others follow one by one—
 Heard their last scream,—and their expiring groan.

SECT. VI.

Of Asphyxia from Famine.

In our attempts to recover those who have suffered under the calamities of FAMINE, great circumspection is required. Warmth and cordials, are the means usually employed : and it is evident that these may prove too powerful in their operation, if not administered with caution and judgment. For the body, by *long fasting*, as we have seen, is reduced to a state of *extreme irritability* ; the minuter vessels of the brain, and of other organs, collapse for want of fluids to distend them ; the stomach and intestines shrink in their capacity ; and the pulsations of the heart and arteries are quick and feeble, with scarce sufficient energy to propel the scanty current of blood. Under such circumstances there are instances of persons who have been suddenly struck dead in consequence of having took a *full meal*, and drank a *glass of brandy*. As with those who have been *frost bitten* or *drowned*, friction with *snow* or *cold water* is the only safe *stimulus* that can at first be applied to the surface, so here the *lowest stimulus* in the scale is to be preferred to that *sudden transition* too often practised by *unphilosophic* practitioners. “ The external heat,” says Dr. Percival, “ should be at first lower than that of the human body, and gradually increased, according

to the effects of that stimulus. Whey, gruel, weak broth, is the only nourishment that can with propriety be administered. If cordials are employed, they should be given with the most frugal hand, and considerably diluted. Perhaps wine whey might be better, and when the *superfluous irritability* is a little worn off, and the stomach strengthened, an egg may be mixed with the whey, or administered under some more agreeable form. But let it be remembered as an indubitable maxim," adds Dr. Percival, "*that the return to a full diet should be conducted with great caution, and by very slow gradations.*"

SECT. VII.

Of Rest from Action.

Sleep and *wakefulness* bear a great resemblance to *exertion* and *rest*; as *wakefulness* is the natural state of *action*, in which the animal machine is fatigued and wasted, and *sleep* the state of *ease*, in which it is refreshed and repaired. Thus we may look upon the time of being *awake* and *active* as the time of wearing out the animal frame; and the time of *sleep* and *rest*, as that in which it is repaired and recruited; for, in action, the *irritable principle* is continually taken from the muscular fibres, which cannot otherwise be replaced than by *rest*.

1. *Of Voluntary Action.*

Not only the *will*, by which the electric fluid is sent into the muscles, but the *muscles* themselves seem, as it were, to get fatigued by exertion, and require a certain time to recruit their powers; for in every contraction of a fibre, there is an expenditure of the *irritable principle*; and where the exertion of the voluntary powers has been for some time increased, and the muscles or organs of motion

have in consequence acted with greater energy, their propensity to activity is proportionally lessened; which can be ascribed to nothing else but the *exhaustion* or *diminution* of the IRRITABLE PRINCIPLE. Indeed every one must have experienced the refreshment arising from *repose*, and it is an established fact, that for a horse to perform a long journey, he should be previously kept at rest for several days in the stable.

Upon waking after a profound sleep, we stretch our limbs, which arises from the *accumulation* of the *irritable principle* in the fibres. From the same cause, when the muscles of our face have been long in a state of inaction, we yawn: and children and young animals, who have abundant irritability, are impatient of confinement, and seem never easy but in a change of position.

2. Of Involuntary Action.

After animal fibres have for some time been exerted into contraction, a *relaxation* succeeds, even though the exciting cause continues to act. In respect to the *irritative motions* this is exemplified in the peristaltic contractions of the bowels, and the beatings of the heart; which cease and are renewed alternately, though the stimulus of the aliment and blood continue to be uniformly applied; in *sensitive motions*, as in fits of the stone and gravel, and in parturition, though the stimulus is perpetual. In our *muscular exertions* it is experienced, as no one can hang long by the hands, however vehemently he wills so to do; and the changes of our attitude evinces the necessity of relaxation to those muscles which have been long in action.

SECT. VIII.

Of Sleep.

Though man in his sleeping state is a much less perfect animal than in his waking hours, and though he consumes more than one third of his life in this his irrational situation, yet is the wisdom of the AUTHOR of NATURE manifest even in this seeming imperfection of his work.

It was before shewn that the application of *stimuli* after a certain time *exhausts* the IRRITABILITY, OR EXCITABILITY, of the system. To recruit which loss, the all-wise and merciful CREATOR has instituted the season of SLEEP, at which time the stimuli of external objects are excluded by the *silence* and the *darkness* of the night; and as *cold** accumulates the irritability of the fibre, it is wisely fore-ordained that this season shall be accompanied with a suitable degree of *cold*. Common or ordinary sleep, produced by the application and action of stimuli, from what has been said, seems therefore, to be a state, the result of a law of the animal œconomy, which takes place in order to remove the effects of stimuli, and to *restore*, as much as possible, the *excitability* of the system; as, during this state the stimulus of volition is suspended, all external objects cease to make impression, even cathartics lose their powers of action, while the *atmospheric air* is almost the only external power, which then continues to be applied, at once carrying off what is excrementitious from the lungs, as it affords, probably, to the system that *principle* which is expended by the various actions of life.

Besides the very great quantity of the IRRITABLE PRIN-

* Hence the evil of *feather beds* and fires in our bed-chambers; for we should court no more than a *suitable degree of warmth*.

CIPLE perpetually *expended* in moving the arterial, venous, and absorbent systems, and the other organs of the body, there is also, during our waking hours, a *constant expenditure* of it by the action of our locomotive muscles and organs of sense. Thus the optic nerves, where they enter the eye, and the great expansion of the nerves of touch beneath the whole of the cuticle, evince the *great consumption* of the IRRITABLE PRINCIPLE by the senses. And our perpetual muscular action in the common offices of life, and in constantly preserving the perpendicularity*

* When any person loses the power of muscular action, whether he is erect or in a sitting posture, he sinks down upon the ground; as is seen in fainting fits, and other instances of great debility. Hence it follows, that *some exertion* of muscular power is necessary to preserve our *perpendicular attitude*. This is performed by proportionally exerting the antagonist muscles of the trunk, neck, and limbs; and if at any time in our locomotions we find ourselves inclining to one side, we either restore our *equilibrium* by the efforts of the muscles on the other side, or by moving one of our feet extend the base which we rest upon, to the new centre of gravity. But the most easy and habitual manner of determining our want of perpendicularity, is by attending to the *apparent motion* of the objects within the sphere of distinct vision. Hence no one who is hood-winked can walk in a straight line for a hundred steps together; for he inclines so greatly, before he is warned of his want of perpendicularity, not having the apparent motions of ambient objects to measure this inclination by, that he is necessitated to move one of his feet outwards, to the right or to the left, to support the new centre of gravity, and thus errs from the line he endeavours to proceed in. Thus any one who stands alone at the top of a high tower, if he has not been accustomed to balance himself by objects placed at such distances, and with such inclinations, begins to, and endeavours to recover himself. During this time the apparent motion of objects at a distance below him is very great, and the impressions of these apparent motions continue a little time after he has experienced them; and he is persuaded to incline the contrary way to counteract their effects; and either immediately falls, or applying his hands to the building, uses them to preserve his perpendicular attitude, contrary to the erroneous persuasions of his eyes. Thus on horseback we accurately observe another person, whom we meet trotting towards us, without confounding his jumping and progressive motion with our own, because we have been

of our bodies during the day, evince a considerable *expenditure* of the IRRITABLE PRINCIPLE by our locomotive muscles. It follows, therefore, that if the exertion of these organs of sense and muscles be for a while *intermitted*, that a *large quantity* of the IRRITABLE PRINCIPLE must be *accumulated*.

As soon as a person begins to sleep (as in *hemiplegia*, where the *limbs* on *one side* have lost their power of voluntary motion, and the patient is for many days employed in moving those of the *other*, or, as when in the *cold fit* of intermittent fever, some parts of the system have for a time continued *torpid*, and have thus expended less than their usual expenditure of the IRRITABLE PRINCIPLE), a *hot fit* succeeds; so, owing to the *suspension* of the voluntary actions, the peristaltic motion of the intestines, and the exclusion of the strong stimulus of mental exertion, an *accumulation* of the IRRITABLE PRINCIPLE takes place during sleep, and the blood-vessels and absorbents have in consequence an increased action, and hence the nutriment is with great energy forced over every part of the system to repair the wastes of the preceding day; for it is probable that *nutrition* is almost entirely performed in SLEEP; and that young animals grow more at this time than in their waking hours, as young plants have long since been observed to grow more in the night, which is generally their time of sleep. Hence also the *heat* of the

accustomed to them both; that is, to undergo the one, and to see the other at the same time. But in riding over a broad and fluctuating stream, though we are well experienced in the motions of our horse, we are liable to become dizzy from our inexperience in that of the water. And when we first go on ship-board, where the movements of ourselves, and the movements of the large waves are both new to us, the *vertigo* is almost unavoidable with the terrible sickness which attends it, and after we come from on ship-board, being used to reel about to maintain our perpendicularity, we have at first the same drunken gait as we had on ship-board.—DR. DARWIN.

system is gradually increased, and the extremities of feeble people, which had been cold during the day, become warm, while in others sweats, are so liable to break out towards morning.*

Methods of inducing Sleep.

From the foregoing Section we have learnt, that *night* is the time adapted for *sleep*; and from the Section on *Habit*,† may learn the *propriety* of *going to bed* and *rising* at a *certain hour*.

We have seen how this state is produced by the proper application of stimulant powers during the day, and since it is to *accumulate irritability* in the system, the chambers in which we sleep ought therefore to be *silent, dark, and moderately cold*; and since the *chief refreshment* of *sleep* arises chiefly from the *oxygen, or vital air*, imbibed by the system, forming a part of the *digestive process* then going on, we should be *cautious* how we are *surrounded by curtains*.

In the state of nature, when the sense of hunger is appeased by the stimulus of agreeable food, and the business of the day is over, the human savage, at peace with the world, then exerts little attention to external objects; pleasing reveries of his successes in hunting succeed, and at length sleep is the result: till the system is recruited, and he awakes with fresh vigour.

In like manner the poor sleep little; forced, by their situation, to lengthen out their labour to their necessities, they however go to bed early in the evening, the irritable principle being exhausted by the labours of the preceding day, and they get up refreshed at sun-rise, and accumu-

* Dr. Darwin.

† Vide the section on *Habit* at the end of Vol. IV, of the fifth edition.

late again fresh irritability by the coolness of the morning.* The blooming complexion of our peasantry, the permanence of their good looks, and their strength and activity, compared with the sickly visage and ailing constitutions of the sons of luxury, who turn night into day, and sleep in beds of down, with large fires in their rooms, clearly demonstrate which mode of life is most conducive to health.

It is justly said by Dr. Mackenzie, that he who sleeps long in the morning, and sits up late at night, hurts his constitution without *gaining time*; and he who will do it merely in compliance with the fashion, ought not to repine at a *fashionable state of bad health*.

Sleep, tired Nature's sweet restorer, cannot be safely dispensed with. *Study*, protracted far into the hours of night, *cares harboured*, and even very *late hours* in company, by encroaching on the hours adapted for sleep, are sure to lay the foundation of many dreadful diseases.

If *sleep* does not pay the accustomed visit, the whole frame of man will in a short time be thrown into disorder; his appetite ceases; his spirits are dejected; and his mind, abridged of its slumbering visions, begins to adopt waking dreams. A thousand strange phantoms arise, which come and go without his will: these, which are transient in the beginning, at last take firm possession of the mind, which yields to their dominion, and, after a long struggle, runs into confirmed madness or death. But it is happy for mankind, that this state of inquietude is seldom driven to an extreme. However, man finds it more diffi-

* Even Dr. Cullen, in his last work, expresses himself with a precision that is not frequently found in his theoretical writings. "A state of sleep," says he, "subsisting for some time, induces a state of the system more ready to be affected by stimuli of all kinds."—*Materia Medica*, II. 223.

cult to procure sleep than any other animal, and some are obliged to court its approaches for several hours together, before they incline to rest. It is in vain that all light is excluded; that all sounds are removed; that books of entertainment are read; the *restless* and *busy mind* still retains its former activity; and reason, that wishes to lay down the reins, in spite of herself, is obliged to maintain them. This is strongly instanced by Shakspeare in the soliloquy of King Henry :

How many thousands of my poorest subjects
Are at this hour asleep !—O ! gentle sleep,
Nature's soft nurse, how have I frightened thee,
That thou no more wilt weigh my eye-lids down,
And steep my senses in forgetfulness ?
Why, rather, sleep, ly'st thou in smoaky cribs,
Upon uneasy pallets, stretching thee,
And hush'd with buzzing night-flies to thy slumber ;
Than in the perfum'd chambers of the great,
Under canopies of costly state,
And lull'd with sounds of sweetest melody ?
O thou dull god, why ly'st thou with the vile,
In loathsome beds ; and leav'st the kingly couch ?—
A watch-case to a common larum bell !
Wilt thou upon the high and giddy mast
Seal up the ship-boy's eyes and rock his brains
In cradle of the rude imperious surge ;
And in the visitation of the winds,
Who take the ruffian billows by the top,
Curling their monstrous heads, and hanging them
With deaf'ning clamours in the slippery shrouds,
That with a hurly, death itself awakes ?
Can'st thou ! O partial sleep ! give thy repose
To the wet sea-boy in an hour so rude ;
And, in the calmest and stillest night,
With all appliances and means to boot,
Deny it to a *king*.—Then happy are *the low*, they lie down,
Uneasy is the head that wears a crown.

It is even thought unnatural for a *King* to enjoy a whole night's rest.

Now pleasing sleep had seal'd each mortal eye,
Stretch'd in the tents the Grecian leaders lie,
Th' Immortals slumber'd on their thrones above;
All, but the *ever-wakeful* eyes of JOVE.
To honour THETIS' son, he bends his care,
And plunge the *Greeks* in all the woes of war:
Then bids an empty phantom rise to sight,
And thus commands the vision of the night.

Fly hence, deluding dream! and light as air,
To AGAMEMNON's ample tent repair.

Bid him in arms draw forth th' embattl'd train,
Lead all his *Grecians* to the dusty plain.

Swift as the word the vain illusion fled,
Descends, and hovers o'er ATRIDES' head;
Cloth'd in the figure of the *Pylian* sage,
Renown'd for wisdom, and rever'd for age;
Around his temples spreads his golden wing,
And thus the flattering dream deceives the king.

Canst *thou*, with all a monarch's cares oppress,
Oh ATREUS' son! can'st *thou* indulge thy rest?
Ill fits a chief who mighty nations guides
Directs in council, and in war presides,
To whom its safety a whole people owes,
To waste long nights in indolent repose.
Monarch, awake! 'tis JOVE's command I bear,
Thou, and thy glory, claim his heav'nly care,
In just array draw forth th' embattl'd train,
Lead all thy *Grecians* to the dusty plain;
&c.—

The phantom said; then vanish'd from his sight,
Resolves to air, and mixes with the night.

In the case of Lord Lyttleton,* the *want of sleep* is

* Dr. Johnson says of this nobleman, that he was “*Inter doctos nobilissimus: inter nobiles doctissimus, inter utrosque optimus: ut enim anti-*

attributed as the cause of his death. *Intense thought* puts the brain into a state more or less unapt for rest, and a multitude of facts, in the ingenious tract of Tissot on the Diseases of *Literary Characters*, prove, that the aptitude of the brain, to restore by sleep, the impaired energies of the corporeal functions, may be lost altogether. Much it imports, therefore, the *studious*, to limit their learned labours to proper hours, to support strength by intervals of exercise in the open air, and to *all others* to solicit sleep by a seasonable dismissal of business and of care.

As the *immediate cause* of sleep consists in the *suspension of volition*, it follows, that whatever *diminishes* the general quantity of the *irritable principle*, or *diverts it* from the faculty of *volition*, will constitute a *remote cause* of sleep;—such as fatigue from muscular or mental exertion, which diminishes the general quantity of the *irritable principle*,—or by increasing of the action of the vascular and absorbent systems, as are the effects of opium, wine, food, &c. which not only by their expenditure of the *irritable principle* diminish the quantity of volition, but also their producing pleasurable sensations (which occasion other muscular and sensual motions in consequence) doubly decrease the voluntary power, and thus more forcibly produce sleep:—or lastly, an increase of the sensitive motions, as by attending to soft music, which diverts the *irritable principle* from the faculty of volition.

Boerhaave, on some occasions, in order to procure sleep for his patient, directed water to be placed in such a situation so as continually to drop on a brass pan.

quam generis claritatem eruditione.—Eruditionem, miro vitæ candore decoravit; sic his omnibus, omnium pulcherrimam apicem, et colophonem addidit, admirabilem animi modestiam!" *Vide* Disquisitions relative to the Nervous System, p. 224.

Fontesque lymphis obstrepunt manantibus,
Somnos quod invitet leves. HOR.

Another method of inducing sleep, says the illustrious Dr. Darwin, is delivered in a very ingenious work lately published by Dr. Beddoes, who, after lamenting that *opium* frequently occasions restlessness, thinks, “that in most cases it would be better to induce *sleep* by the *abstraction* of *stimuli*, than by *exhausting* the *excitability* ;” and adds, “upon this principle we could not have a better soporific than an atmosphere with a diminished proportion of oxygen, or vital air, and that common air might be admitted after the patient was asleep.”

In a subsequent work, this ingenious physician says, I had formerly been led to infer, “*that an atmosphere, with a diminished proportion of oxygen, would be in some cases a better soporific than any we at present possess, and I have since received confirmation of this opinion.*”

“A person in a consumption, who for months had taken *opium* at night, slept perfectly well *without opium* when he came to respire HYDROGEN GAS ; his sleep he remarked to be more profound than usual. The air of his room being loosely mixed with HYDROGEN GAS, his servant, a *very bad sleeper* declared that he did not know what was come to him, he slept so sound. This man necessarily inspired much HYDROGEN GAS from attendance on his master. In two consumptive patients, I am able to induce sleep *almost at pleasure* by the HYDRO-CARBONIC AIR.* In a great majority of such cases, it is well known, that the nights are exceedingly disturbed in spite of *opium* freely administered. The soporific virtue of HYDROCARBONATE seems, however, from the experience I have had, by no means confined to consumption.”

* A mixture of *fixed* and *inflammable* airs

The analogy which obtains between *sleep* and the state of *torpor*, is so striking, and at the same time so applicable to the present subject, that it seems to deserve more attention than as yet has been bestowed upon it.

“The class of *dormant animals*, says the celebrated natural historian, M. de Buffon, are not, as vulgarly imagined, in a state of absolute *sleep*, for the respiration is scarce perceptible, and the blood is cold, or scarcely exceeds the temperature of the outward air. There is little reason then to wonder why these animals, so inferior comparatively to others in point of heat, should become torpid, as soon as their own small portion of internal heat ceases to be assisted by the external warmth of the air; a circumstance which naturally happens when the thermometer is not more than 10 or 11 degrees above congelation. The same extends to all torpid animals during the winter. Alike are its effects on the dormouse, the hedge-hog, and the bat. Of this class the *marmot* is the most remarkable, which delights in the regions of ice and snow, and is never found but on the highest mountains; it, nevertheless, of all others, is the most liable to be rendered torpid by cold.

“This animal, though extremely active in summer, lays up no provision for the winter, because such a precaution would be useless* during its dormant state. But when he perceives the first approaches of the season, in which his vital motions are to continue in a great measure suspended, *he closes up the apertures of his subterraneous dwelling with such solidity, that it is more easy to open the earth any where*

* The *bees*, which were transported to Barbadoes, and other western islands, ceased to lay up honey *after* the first year, and became very troublesome; but those in Jamaica continued to make honey, as the cold north winds, or rainy seasons of that island, confine them at home for several weeks together.—Dr. Darwin.

else, than where he has closed it. When their retreat is discovered, they are found, each *rolled into a ball*, and apparently lifeless. In this state they may be dragged roughly along the ground, or even killed, without testifying any sense of pain.

“By a *mild and gradual heat alone* are they to be recovered from this torpor, and if brought suddenly before a *fire*, they *perish*. A few degrees above the tenth or eleventh degree are sufficient to re-animate them; and if they are kept in a *warm* place during the winter, they do not become torpid, but continue as lively as at any other time. If the marmot remains longer torpid than the dormouse, it is probably because the weather of the climate is longer cold.

“It is curious, adds M. de Buffon, to observe this animal, when he is prematurely forced to pass from the torpid to an active state. He first yawns, fetches a deep sigh, and utters broken inarticulate sounds like a drunken man. His limbs become less rigid, he stretches out his legs, fetches another still deeper sigh, opens his eyes, and at length recovers. Such are the uneasy sensations he visibly undergoes, from a sudden and forced re-animation; which is probably performed in a more gentle and imperceptible way by the vernal warmth, when left in his cell.—*But what is singular, he never becomes torpid, though exposed to a degree of cold equal to that of freezing, provided he is kept in the open air instead of a close place.*”

SECT. IX.

Of the Difficulty of the Application of the Brunonian Principles.

A judicious practitioner, and who prescribes according to the rules that arise from a near acquaintance with the

operations of the inanimate part of matter upon living systems, will find plenty of scope for the exercise of his judgment in cases of *accumulated irritability*; and he will find that the Brunonian doctrine, as it is now stiled in derision by those who know it not, is not a doctrine to be practised without knowledge, without judgment, and without sense; but that it requires every part of knowledge requisite to throw light upon so extensive a subject, and all the judgment and good sense of the soundest understanding to carry it into application upon many occasions of nicety and difficulty. The trash that has hitherto too often passed for knowledge, is to be considered not only as useless but hurtful. But the true knowledge of Nature must be always elegant, always satisfactory, always useful. "It is to be hoped," says Dr. Brown, "that the day is not far distant, when my doctrine will change its present appellation into that of the laws of Nature over the living part of her productions."

SECT. X.

The two-fold Division of Diseases, into the sthenic and asthenic.

Dr. Brown, with a greatness of mind peculiar to himself, looked down upon disease

Quasi ex turrite altâ,

as from a lofty tower, and marshalled them out into two ranks, the *sthenic*, as depending upon vigour, and *asthenic*, as shewing a weakness, or atony, of the frame.

We have before set forth the condition of health, when the state of the *irritable fibre* was that of *tone*, and the *stimuli* in *due proportion*; also the state of disease, when *these* were in an *undue balance*; and we are now arrived

at the consideration of those diseases from the excess of deficiency of stimuli.

SECT. XI.

Phrenitis; or, Inflammation of the Brain.*

The distinguishing signs of this disease are,

1. A furious delirium.
2. Redness and turgescence of the face and eyes.
3. Impatience of light and noise.
4. A quick, hard, and generally steady pulse, sometimes however very full.
5. The fever very high.
6. Constant wakefulness.
7. Restlessness.
8. Great increase of muscular strength.
9. Head-ache, violent.

We are not to confound the delirium, which is a common symptom in many fevers, with the original inflammation of the brain, which will readily be distinguished by observing, that in the phrenitis the delirium is evident, and violent, before there be any remarkable degree of fever; whereas, in the common febrile delirium, the disease is always of some days continuance before the delirium is observable, and the degree of raving is correspondent to the degree of fever: but in the true phrensy the degree of fever is never correspondent to the delirious fury, which is equal to what we meet with in real madness, from which the inflammation of the meninges is hardly to be distinguished but by the shortness of its duration; for it must terminate either in recovery or death, in the space of a very few days.

* From *Φρην*, the mind.

The original or true phrensy is not a common disease in these temperate climates; but in the hot countries, where people are often exposed to the sun, and incautious of defending the head from the scorching heat, the vessels in that part are frequently so weakened and irritated, that they give way to the force of the fluids, and become the seat of an inflammation, which very seldom admits of a favourable crisis, as one may readily conceive, from considering the delicacy of the affected vessels, and their importance in the animal economy.

Sauvage, by dividing inflammations into *membranaceæ* and *parenchymatosæ*, was here under the necessity of making two distinct genera, *phrenitis* and *cephalitis*; and he splits these into no less than twenty-four species; intending, by the first, those cases wherein only the meninges is inflamed; and, by the second, those wherein the substance of the brain and cerebellum become the seat of the disease. These distinctions, with respect to practice, are totally superfluous, as being only different stages of the same disease; for the phrenitis, before the patient dies, will generally run on till it becomes a cephalitis.

The termination of phrenitis, if it does not soon resolve itself, is an incurable mania, or idiotism.

SECT. XII.

Apopléxia ;* or, *Apoplexy*.

This disorder is marked,

1. By a sudden privation of all the powers of sense and voluntary motion.
2. The joints remain flexible, and the muscles flaccid.

* From *αποπληξιν*, to strike down.

3. The person affected seems to be in a most profound sleep, with a sonorous breathing, or snoring.

We may distinguish a fit of apoplexy from that of swooning, by observing the pulse and respiration. In apoplectic cases,

4. The pulse is always strong and full.
5. The countenance is flushed for the most part, and always looks full and feels warm.

Whereas in syncope,

1. The pulse is either greatly weakened, or not to be felt at all.
2. The breathing is not observable.
3. The countenance falls.
4. Redness forsakes the lips, and
5. The flesh feels cold.

In general, apoplexy seizes people who are inclined to be corpulent, have a florid complexion, are full of blood, with short necks, and who indulge too freely in the pleasures of the table, without taking proper exercise. And what makes me more especially place this disease among the sthenic is, that there is always reason to suspect an oppressed brain, and the rupture of a vessel is the usual consequence, or the suffusion of serum, which produces palsy of the nervous system.*

The reader will please to observe that all sthenic diseases in their sequel become asthenic, hence the puzzlings they have created to systematic nosologists, and the error which nosology introduces into practice. In our method we avoid all this, and follow the path of nature. We shall

* John Hunter, who paid much attention to this subject, in all the cases he dissected at St. George's hospital, found a coagulum of blood, or suffused serum. Vide Dr. Bayley's *Morbid Anatomy*.

trace here, in their order, sthenic diseases, commencing from the head, and so going downwards, until we arrive at the extremities, remarking the sequels of each.

SECT. XIII.

Hydrocéphalus; or, Dropsy of the Brain.

“Having, (says Dr. Rush), for many years been unsuccessful in all the cases, except two, of internal dropsy of the brain, which came under my care, I began to entertain doubts of the common theory of this disorder, and to suspect that the effusion of water should be considered only as the effect of a primary inflammation, or congestion of blood in the brain.

“I mentioned this opinion to my colleague, Dr. Wistar, in the month of June, 1788, and delivered it the winter following in my lectures. The year afterwards I was confirmed in it by hearing that the same idea had occurred to Dr. Quin. I have since read Dr. Quin’s treatise on the dropsy of the brain with great pleasure, and consider it as the first dawn of light which has been shed upon the theory of this disorder. In pursuing this subject, therefore, I shall avail myself of Dr. Quin’s discoveries, and endeavour to arrange the facts and observations I have collected in such a manner, and to form a connected theory from them, which I hope will lead to a new and more successful mode of treating this disease.

“I shall begin this inquiry by delivering a few general propositions.

1. The internal dropsy of the brain is a disorder confined chiefly to children.

2. In children the brain is larger in proportion to other parts of the body, than it is in adults; and of course a greater proportion of blood is sent to it in childhood than

in the subsequent periods of life. The effects of this determination of blood to the brain appear in the mucous discharge from the nose, and in the sores on the head and behind the ears, which are so common in childhood.

3. In all febrile diseases there is a preternatural determination of blood to the brain. This occurs in a more especial manner in children; hence the reason why they are so apt to be effected by convulsions in the eruptive fever of the small-pox, in dentition, in the diseases from worms, and in the first paroxysm of intermitting fevers.

4. In fevers of every kind, and in every stage of life, there is a disposition to effusion in that part to which there is the greatest determination. Thus in inflammatory fever, effusions take place in the lungs and in the joints. In the bilious fever they occur in the liver, and in the gout in every part of the body. The matter effused is always influenced by the structure of the part in which it takes place.

“ These propositions being premised, I should have proceeded to mention the remote causes of this disorder; but as this inquiry may possibly fall into the hands of some gentlemen who may not have access to the description of it as given by Dr. Whytt, Dr. Fothergill, and Dr. Quin, I shall introduce a history of its symptoms taken from the last of those authors. I prefer it to the histories by Dr. Whytt and Dr. Fothergill, as it accords most with the ordinary phenomena of this disorder.

1. In general the patient is at first inactive.
2. Often drowsy and peevish.
3. The skin is observed to be hot and dry towards the evening.
4. There is a sharp head-ache chiefly in the fore-part, or, if not there, generally in the crown of the head, or one side.

5. The head is often inclined to the side affected.
6. The patient at this period dislikes light.
7. Whines much.
8. Sleeps uneasy.

When the symptoms above-mentioned have continued for a few days,

9. The axis of one eye is generally found to be turned in towards the nose.
10. The pupil on this side is rather more dilated than the other.
11. If both eyes are similarly affected, the pupils are enlarged.
12. The head-ache becomes more excruciating.
13. Pyrexia now increases, the pulse is frequent, breathing quick, exacerbations of the fever take place towards evening, and the face is occasionally flushed; usually one cheek is much more affected than the other.
14. Temporary perspirations break out bringing no relief.
15. Delirium, and that of the most violent kind, particularly if the patient has arrived at the age of puberty, now takes place.

“ The disease, if not resolved, then undergoes that remarkable change, which sometimes suddenly points out the commencement of what has been called its second stage: the pulse becomes slow but unequal, both as to its strength, and the intervals between the pulsations; the pain of the head, or of whatever part had previously been affected, seems to abate, or at least the patient becomes apparently less sensible of it; the interrupted slumbers, or perpetual restlessness which prevailed during the earlier periods of the disorder, are now succeeded by an almost lethargic torpor, the strabismus, and dilatation of the

pupil increase, the patient lies with one, or both eyes half closed, which, when minutely examined, are often found to be completely insensible to light; the vomiting ceases; whatever food or medicine is offered, is usually swallowed with apparent voracity; the bowels at this period generally remain obstinately costive.

“ If every effort made by art fails to excite the sinking powers of life, the symptoms of what has been called the second stage are soon succeeded by others, which more certainly announce the approach of death. The pulse again becomes equal, but so weak and quick, that it is almost impossible to count it; a difficulty of breathing, nearly resembling the *Stertor Apoplecticus*, is often observed; sometimes the eyes are suffused with blood, the flushing of the face is more frequent than before, but of shorter duration, and followed by a deadly paleness; red spots, or blotches, sometimes appear on the body and limbs; deglutition becomes difficult, and convulsions generally close the scene. In one case, I may observe, the jaws of a child of four years of age were so firmly locked for more than a day before death, that it was impossible to introduce either food or medicine into his mouth; and in another case, an hæmiplegia, attended with some remarkable circumstances, occurred during the two days preceding dissolution.

S E C T. XIV.

Opthálmia; * or, *Inflammation of the Eyes*.

This disease is seated generally in the adnata, or whites of the eye.

1. The vessels which before only allowed the passage of serum now admit of red globules.

* From *ὀφθαλμος*, the eye.

2. There is great pain, especially upon moving the balls of the eye.

3. There is a frequent effusion of tears.

When the affection of the adnata is considerable, the inflammation is not unfrequently communicated to the subjacent membranes of the eye, and even to the retina itself, which acquires so great a sensibility, that

4. The slightest impression of light becomes intolerable.

Oculists have multiplied diseases of the eye and parts surrounding, without end. Dr. Rowley has lately published a work, giving names and remedies for one hundred and eighteen principal diseases in the eyes and eyelids; but however one may admire his ingenuity, we shall not follow him in splitting of hairs, for, as Cullen justly observes, such divisions are idle, if not hurtful; for all cases of inflammation of the membranes differ only in their intensity, as blue varies from azure to indigo, and are to be cured by remedies of the same kind more or less employed.

The inflammation of the eye sometimes produces a thickening of the thin membrane covering the eye, general or partial, creating blindness from the opacity of the cornea, and when the suffusion of lymph is internal, coating the retina, and obstructing the impulse of light on it; and the crystalline lens is sometimes rendered obscure from the same cause, and at times the ball of the eye itself suppurates, and, corroding every part, obliterates the whole, leaving only an empty socket.

SECT. XV.

*Erysipelas;** or, *Saint Anthony's Fire*

The Erysipelas of the face comes on,

* From *ερευν*, to draw, and *προς*, near, because it affects the neighbouring parts.

1. With a cold shivering, after which succeeds,
2. The hot stage, which is frequently attended,
3. With confusion of the head, or delirium.
4. Drowsiness, sometimes
5. Coma.
6. Pulse frequent, commonly full and hard.

When these symptoms have continued for one, two, or at most three days, there appears

7. A redness covering the face, at first not very vivid, readily disappearing upon pressure, but quickly returning again.
8. This redness gradually spreads from the part it first occupied to the other parts of the face, commonly till it spreads over the hairy scalp, or descends upon some part of the neck.
9. As the redness spreads with a pain like that from burning, it commonly disappears, or at least decreases in the parts it had before occupied.
10. All the parts upon which the redness appears are at the same time affected with some swelling, which continues for a time after the redness has abated.
11. The whole face becomes considerably turgid.
12. The inflammation coming upon the face does not produce any remission of the fever which had before prevailed; and sometimes the fever increases with the increasing and spreading inflammation.
13. The inflammation usually continues eight or ten days; and, for the same time, the fever and symptoms attending it also continue.
14. When the redness and swelling have proceeded for some time, there commonly arise, sooner or later, blisters of a larger or smaller size, on several parts

of the face, containing a thin yellowish, or almost colourless liquor.

15. The surface of the skin, in the blistered places, sometimes becomes *livid* and *blackish*; but this *livor* seldom goes deeper than the surface, or discovers any degree of gangrene affecting the skin.
16. On the parts of the surface not affected with blisters, the cuticle suffers, towards the end of the disease, a considerable desquamation.
17. The eye-lids are often so much swelled as entirely to shut up the eyes.

Erysipelas sometimes occasions suppuration of the eye-lids, but with the inflammation the fever commonly ceases; and, without evident crisis, the patient returns to his ordinary state of health.

Persons who have once laboured under this disease are very liable to have returns of it, especially in spring and fall.

SECT. XVI.

Otitis;* or, *Inflammation of the Ear*.

This is marked by so excruciating a pain in the ear, as often to render the patient almost delirious.

It often ends in suppuration, and produces incurable deafness.

SECT. XVII.

Coryza;† or, *Defluxion of the Nose*.

This is rarely an idiopathic disease, but generally the first symptom of cold, or indication of an approach-

* From *ος*, the ear.

† From *κεφα*, the head, and *ζω*, to flow.

ing asthma, or measles; it is usually accompanied with sneezing.

S E C T. XVIII.

Cynanche Tonsilláris;* or, Quinsy.

This is an inflammation of the mucous membrane of the fauces, affecting especially that congeries of mucous follicles which form the tonsils, and spreading from thence along the velum and uvula, so as frequently to affect every part of the mucous membrane.

The symptoms of this disease are,

1. Pain in swallowing.
2. Tumour sometimes considerable, being at first one of the tonsils enlarged.
3. Inflammation surrounding the tonsil.
4. Deglutition difficult and accompanied with considerable pain.
5. Frequently this disease passes over to the other tonsil, and then deglutition is almost impossible, producing a sense of almost immediate suffocation.
6. A troublesome clamminess of the mouth and throat.
7. A frequent but difficult excretion of mucus.
8. The neck is sometimes puffed up, and this is reckoned not an unfavourable circumstance, as it denotes less danger of suffocation.
9. There is often a pain of the internal ear, from the inflammation extending to the Eustachian tube.
10. Pulse often an hundred, full, strong, and hard.

It is not unusual in this disease to see patients able to swallow solids with less difficulty than liquids, because the swallowing of liquids requires the action of more of

* From κυων, a dog, and αγγχειν, to strangle, and tonsillæ, the tonsils.

the muscular fasciculi subservient to deglutition, than that of solids; the spittle, on account of its viscosity, being more difficult to swallow than even the liquids used for drink, the patient suffers it to accumulate in the fauces, and hence the continual hawking, which increases the pain of the parts affected, and prevents sleep.

The cynanche tonsillaris terminates by resolution, that is dispersion, or subsiding of the tumour and inflammation; or by suppuration.

SECT. XIX.

Cynanche Tracheális ;* or, *Croup*.

The seat of this disease is the membrane lining the upper part of the trachea.

The symptoms characteristic of it are the following :—

1. A hoarseness, with some shrillness and ringing sound, both in speaking and coughing, as if the noise came from a brazen tube.
2. Difficult respiration, shewn by a whizzing noise in inspiration, as if the passage of the air was straitened.
3. A dry cough.
4. Pulse frequent and full.
5. An uneasy sensation of heat.
6. Pain situated about the larynx.
7. Sometimes a redness and swelling about the fauces.

In this disorder, so quick and fatal to children, the sequel of the inflammation, if not resolved, is an exudation analogous to that found on the surface of inflamed viscera, appearing partly in a membranous crust, and partly in a fluid somewhat resembling pus; hence,

* From *τρυχίς*, the wind-pipe.

8. If any thing is spit up, it is purulent matter, sometimes containing films resembling portions of a membrane; hence,

9. A sense of suffocation, which actually happens from the obstruction of the trachea, often extending along its ramifications, or bronchia.

In Dr. Hunter's Museum you may see a beautiful specimen of this membrane.

SECT. XX.

Carditis;† or, Inflammation of the Heart.

The membranes which line and divide the chest, are extremely liable to become the seat of active inflammation, as well as the lungs. The heart also, and pericardium, are also subject to the same inflammation (though the examples are rare) as may be discovered from the inspection of dead bodies after death, wherein the heart has sometimes been found in a state of suppuration, and crusted over with purulent matter. The characters of Carditis, however, are dubious and equivocal, resembling those of the other thoracic inflammations, whose general characters, however, are,

1. Fever, ushered in with rigour.
2. Difficult breathing.
3. Head-ache.
4. Pain in the region of the heart.
5. The pulse frequent and irregular, hard, and quick.
6. Increase of symptoms, when lying on the left side.
7. Palpitation.
8. The greatest anxiety and distress.
9. Syncope, or faintings.

† From καρδια, the heart.

SECT. XXI.

Pleuritis;* or, *Pleurisy*.

The characters of this disease are,

1. Fever.
2. A hard tense pulse, usually full.
3. Acute pain, or stitch in the right side, seated under the sixth or seventh rib, near the fleshy part of the breast. This does not commence until some hours after the fever, and often is not felt until the third or fourth day.
4. A teasing, dry cough, and
5. A straitness, or oppression, of the chest.
6. The blood cupped and covered with a buff coat.

But, as Cullen justly observes, this inflammation, local at first, commonly communicates to the contiguous parts, and extends not only over that part covering the ribs, but also over the mediastinum, and the whole surface of the lungs, for upon dissection it has been shewn, in a hundred of instances, that the pleura, in its contracted sense, is hardly ever affected alone, the inflammation being generally extended over the mediastinum, and the whole membranous body of the lungs, in which case we have a peripneumony.

SECT. XXII.

Peripneumonia;[†] or, *Inflammation of the Lungs*.

We have before seen, that peripneumony is only a more general inflammation of the membrane which lines the

* From *πλευρα*, the membrane investing the thorax.

† From *περι*, about, and *πνευμων*, the lungs.

chest, as well as the lungs, both external and internal, and it is contra-distinguished by authors from pleurisy, by

1. A moist cough, the matter spit up being frequently streaked with blood.
2. The pain is situated sometimes under the sternum, sometimes in the back, betwixt the shoulders; and when in the sides, its place has been higher, or lower, more forward, or backward, than in the true pleurisy.
3. The pain is generally dull and obtruse, rather an expression of disease, than an acute pain.
4. The breathing is much more laborious.
5. Great pain upon inspiration.
6. Pulse less full and hard than in pleurisy, often thready.

Sauvage has made two distinct genera of the pleuritis and peripneumonia, and has subdivided them into no less than thirty-two species; twenty of pleurisy, and twelve of peripneumony. Though these minute distinctions are extremely satisfactory, considered as histories of the disease, and the industry and accuracy of the observer are greatly to be admired, and commended, yet they are of no use taken on the great scale of things, and cannot assist the practitioner in his indications of cure. Perhaps it would have been better to have considered pleurisy and peripneumony as one disease.

The pneumonic, like other inflammations, may terminate by resolution, the excitability being worn down by the disease, when the cough gradually ceases, and the patient by degrees recovers his former health.

But in cases where the patients have not been properly treated at first, the pneumonic, like other inflammations, may terminate in suppuration, sometimes producing the deposition of coagulable lymph on the surface of the

pleura, which form numberless *adhesions*, joining the convex surface of the lungs to the ribs, or a *vomica* may be formed in the lungs, which very frequently is a considerable time before it bursts; and, in some cases, where there happens to be but little pressure on any of the larger trunks of the pulmonary vessels, and the cyst is of a compact texture, these abscesses will occasion no great distress, nor much hectic fever; for, if there be little or no absorption, we shall have little or no hectic fever; but whenever the *vomica* breaks, and the purulent matter is taken up by the absorbents, and carried into the circulation, then the patient will be seized with alternate cold and hot fits, which will bring on profuse sweats, and in the end destroy life, unless it should so happen, that the purulent matter shall be discharged by expectoration.

We may know that a *vomica* is formed, if after fourteen days the symptoms, though abated in violence, shall still appear far from being removed; the cough, difficulty of breathing, and oppression continuing, though the pain has ceased; the pulse still quick, though weaker and softer; and if, joined to these, the patient shall feel a slight shivering, and this be succeeded by heat, we may be certain that a suppuration has taken place: and when we find these symptoms grow every day more and more distressing, that the cough is exasperated upon the least motion, and the patient can only lie on the affected side, or perhaps cannot lie down at all, while weakness and wasting are daily more evident, then we may be assured that there is a formed collection of matter, from which the patient will have little or no prospect of escaping, unless the abscess should happen to burst into the branches of the trachea, in such a gradual manner as not to occasion suffocation, but allow the purulent matter to be coughed up, and expectorated by degrees.

This disease, then, has also a termination peculiar to itself, which is a rupture of a vessel, and suffusion, which often brings on the fatal catastrophe, or is the foundation of a true phthisis, or consumption.

From the debility in the absorbents, occasioned by a long protracted pneumonia, the effused serum exhaled to lubricate every part is not taken up as quick as deposited; hence the frequent sequel of pneumonia, hydrothorax, or water in the chest.

SECT. XXIII.

Catarrhus; or, Catarrh.*

Inflammation was before explained, when speaking of the manner in which rheums in the head, creaks in the neck, inflammation of the eyes, colds, and rheumatic pains were produced, vide Vol. II. Sect. V. to depend upon an increased irritability arising from an exposure to partial cold, and subsequent stimuli.

We will here enter more particularly into the symptoms of catarrh.

1. It is not till the next day, or perhaps the second or third day, that the person who has caught cold begins to complain, and recollects his exposure to cold, either partial (as is most common) or general.

This frequent, but curious fact, is similar to what happens in the operations in the causes of other febrile diseases. From the commencement of their action on the body, some time must elapse before the system in general can be affected by them, so as to produce the disease corresponding to the nature of the cause. The symptomatic fever, in consequence of wounds, amputations, and other

* From κατὰρσεν, to flow down.

chirurgical operations on the body, is seldom considerable till the third day after they have been performed. So with blisters, it is some hours before the action commences. This cause will go on slowly, acting imperceptibly, until the system in general is affected, exciting,

2. More or less of fever, or that disagreeable sensation over the body which generally precedes the accession of fever.
3. The least cold produces uneasiness, even in warm weather.
4. The membranes of the nose become first affected, and there is a dryness, and afterward defluxion of that part.
5. Often the amygdalæ, and other glands about the throat, mark the first stage of this disorder.
6. There is frequently considerable hoarseness, especially towards night.
7. In a few days the trachea, or windpipe, becomes affected, when the throat appears husky.
8. After which, the natural secretion is increased, and altered, and there is a considerable discharge of a thin sharp rheum from the glands of the throat and fauces.
9. The secretion from the upper parts decreases, and it is now said to fall upon the breast, which feels tight.
10. At first there is only a tickling uneasy cough, expectoration comes on, which is thin at first, gradually becomes thicker,
11. And diminishes in quantity until the morbid secretion ceases with the recovery of the patient.

Unfortunately for the unthinking part of the human race, colds so often resolve themselves under every treatment, and being unaccompanied with sickness or pain, are

therefore foolishly neglected. It is only a cold, and hence little heeded. So the man goes to battle and escapes; but will the same good luck always await him? The pitcher that is often taken to the well comes home at last broken. Persons who have colds on them are too often tempted, on account of business or pleasure, to expose themselves to vicissitudes of cold and heat, by which means that preternatural irritability brought on the internal membrane of the bronchia is kept up, and the increased secretion and cough are often protracted for a considerable time. For, when the system is once morbidly affected, or even after the patient has apparently recovered from his indisposition, causes of the same kind, though greatly inferior to what was at first necessary for the production of the disease, will exasperate it, or subject the person to a relapse often more severe than the first attack.

From these repeated attacks spitting of blood often arises, and very frequently obstructions are formed, called tubercles.

It is highly probable, that a gradual resolution of such obstructions takes place, especially if the person escapes a return of the same disorder for any considerable time. But if, from repeated colds, these obstructions increase in number and obstinacy, they become at last irresolveable, and lay the foundation of what are called turbercles in the lungs, which are sometimes attended with difficulty of breathing on any brisk or violent exercise, and are often the cause of a chronic dry cough. But, as these complaints are temporary, and not accompanied with pain, the danger of the disorder is frequently overlooked, till, by some future catarrh, they are irritated into a state of inflammation, and afterwards suppurating, bring on a phthisis pulmonalis, the most treacherous and mortal of all diseases.

Also every one who has been afflicted with a severe catarrh, ending in a troublesome cough of long duration, becomes more liable to returns of it, on catching cold, than he was before the first attack of that disorder. Such a person comes, by degrees, to have larger secretions of phlegm in his lungs than formerly, and, in consequence of it, frequent fits of coughing, without any accession of cold, especially in the winter or cold weather, partly from a diminution of perspiration, but chiefly from the general operation of cold on the body. This gradually increases as age advances, and often proves not only the cause of habitual coughs, but of the humoral asthma.

SECT. XXIV.

Febris Catarrhâlis; or, a Catarrhal Fever

This disease commonly comes on with the same symptoms as other febrile diseases, that is,

1. With alternate chills and heats, often there is no pyrexia.
2. The cough comes on almost at first.
3. Accompanied with some expectoration, generally of a thick ropy mucus.
4. The face is swelled and flushed.
5. Some giddiness and drowsiness accompanies the disease.
6. There is a sense of lassitude over the whole body.
7. There is a difficulty of breathing.
8. A sense of oppression, and straitness of the chest.
9. With some obscure pain there.
10. The cough is frequent and violent.
11. Sometimes it excites even vomiting.
12. Frequently a rending head-ache accompanies this disease.

13. The blood drawn shews a buffy surface.

This disease has often the appearance only of a more violent catarrh, and after the employment of some remedies is entirely relieved by a free and copious expectoration. In other cases, however, the feverish and catarrhal symptoms are at first very moderate, and even slight; but after a few days, these symptoms suddenly become considerable, and put an end to the patient's life, when the indications of danger were before very little evident.

From the different circumstances in which this disease appears, the pathology of it is difficult. It is certainly often no other at first than a *catarrhal affection*, which, in elderly persons, is frequently attended with a large afflux of mucus to the lungs; and it was on this footing that Sydenham considered it as only differing in degree from his *Febris Hyemalis*. A catarrh, however, is strictly an affection of the mucous membrane and follicles of the bronchiæ alone: but it may readily have, and frequently has, a degree of pneumonic inflammation joined to it; and in that case may prove more properly the peculiar disease we treat of here. But, further, as pneumonic inflammation very often produces an effusion of serum into the bronchiæ, so this, in elderly persons, may occur in consequence of a slight degree of inflammation; and when it does happen, will give the exquisite and fatal cases of the peripneumonia notha, or bastard pleurisy, called such when there is a suffusion of sputa, or lymph, thrown out into the cellular texture of the lungs.

SECT. XXV.

Contageous Catarrh; or, Influenza.

As contageous diseases demand the popular attention, being such as generally exclude the advice of physicians,

who, provided they escape, are too much employed to attend every one who is seized, I shall be as explicit on this disease as possible.

Whilst it was the general opinion of philosophers, that all things upon earth were governed by the heavens, physicians imputed the epidemical catarrhous semipestilential fever to the influence of the stars; whence the Italians gave it the name of influenza. From Hippocrates to Sydenham, it was known and is mentioned by the name of *febris catarrhalis epidemica*: but Sydenham chiefly calls it *tussis epidemica*. Since Sydenham's time it has been variously named, but is now generally known by the name of *influenza*.

Dr. Fothergill's account of this disease, as approaching more nearly to our own times, deserves the highest attention.

About the beginning of the last month, the end of the year 1775, it was mentioned to me, says the benevolent Dr. Fothergill, that in many families most of the servants were sick; that they had colds, coughs, sore throats, and other pulmonic complaints.

In the space of a week these complaints became more general; few servants escaped them, especially the men, who were most abroad: many of the other sex, likewise, and people of higher conditions, were attacked; nor were children exempted.

The disease, which had hitherto been either left entirely to itself, or had been treated with the usual domestic medicines appropriated to colds, now claimed the attention of the faculty, and, for the space of near three weeks, kept them universally employed.

Most of those whom I saw were seized (and often so suddenly as to be sensible of the attack),

1. With a swimming, or slight pain in the head.

2. A soreness of the throat.
3. Pains wandering over the body, with a sense of coldness, particularly in the extremities.
4. A cough, soon followed by
5. A running of the nose.
6. Watery eyes.
7. Slight nausea.
8. More or less feverish heat.
9. Inquietude.
10. Pain about the breast.
11. The tongue was always moist.
12. The skin seldom hot and dry.
13. The pulse often full, quick, and hard.

In a few days every complaint abated, except the cough, which continued after the subsiding of the other symptoms, which in the fore part of the night was exceedingly troublesome and vexatious, and towards morning there generally came on a sweat and easy perspiration.

Many who neglected themselves, and went abroad with the distemper upon them, frequently got additional colds, and brought on a fever of the most dangerous kind ; a few died phrenitic.

Old asthmatic persons were likewise great sufferers for the most part ; a peripneumonic fever came gradually on, which often terminated fatally. And of those who did recover, their amendment was slow, and treatment difficult.

And, indeed, it appeared that very few persons wholly escaped the influence of this morbid constitution ; for it seemed to aggravate every present malady.

It proved fatal likewise to several very young children, disposing them to violent coughs or diarrhœas.

During this time, horses and hogs were much affected ; those especially that were well kept. The horses had

severe coughs, were hot, forebore eating, and were long in recovering. Not many of them died that I heard of; but several dogs.

To the consideration of the faculty in this city, is this sketch of the late epidemic submitted, with all due deference; and with a request, that if the observations they have made do not correspond with this recital, they will be pleased to communicate their remarks while the remembrance of the facts are recent; in order that as exact an account of this disease as possible may be transmitted to our successors.

If those physicians in the country, into whose hands this essay may come, will be so obliging as to mention the time when this epidemic made its appearance in their neighbourhood, and wherein it differed from the preceding sketch, either in the symptoms or the method of cure, they will likewise contribute to the same good purpose. *The united observations of the faculty at large must greatly exceed the utmost efforts of any individual, however warmly he may be disposed to promote the utility of his profession.*

JOHN FOTHERGILL.

London, December 6, 1775.

In consequence of this circular letter, Dr. Fothergill received the following answers. First from

SIR JOHN PRINGLE, Bart.

President of the Royal College of Physicians.

1. The species that I had of the influenza was a sore throat, with fever and shooting pains through the back part of my head; but these symptoms were never followed by a cough. I heard of several others, who, like me, had never been troubled with a cough, and only with this inflammatory angina,

2. I think you do well to record the state of the weather; but I think the conclusion ought to be, that the sensible qualities of the air had most probably no share in producing this epidemic, I should be tempted to say, that they had evidently no part; for we hear of the same distemper having been in Italy, France, and in the Low Countries; and, I doubt not, in other parts of Europe, had we inquired. But it cannot be supposed that the state of the atmosphere, either as to weight, heat, or moisture, was the same every where. And in the same country have we not seen it rage in one district, or city, whilst others, at no great distance, were totally free? Yet between the sound and the sickly there could be no considerable meteorological difference. My conclusion, therefore, should be, that such epidemics (of which there have been four in my remembrance) do not depend on any principles we are yet acquainted with, but upon some others, to be investigated, and by such means as Dr. Fothergill very properly and most commendably proposes to be done by the united inquiries of his brethren.

DR. HEEERDEN.

December 16, 1775.

The 28th of October was the first day on which the late epidemic cold seized upon any one whom I had an opportunity of observing; and at the end of three weeks the cause, whatever it was, of this distemper, was so far weakened, as to be incapable of infecting those who had escaped it until that time; though many, who had suffered by it before, continued to complain of the cough and hoarseness much longer. The violence of this distemper usually began to abate in five or six days.

In some it began with a sickness and perpetual vomiting, which were the forerunners of a severe degree of this illness;

in others the symptoms were sneezing, and a copious defluxion from the nose and eyes, and these suffered much less, and were sooner recovered. Many complained of a hoarseness and sore throat, and of a tightness, oppression, and heat of their breasts, and of feeling pains in various parts, particularly in their heads, sides and backs. Almost every one of these patients was afflicted with a racking cough; with a sense of coldness frequently returning upon them; with a failure of appetite and of sleep; and with a languor and weakness much greater than might have been expected from the effects of any of the other symptoms. The degree of fever was seldom great. I saw two persons in this distemper who had eruptions upon their skins resembling that of a scarlet fever. In two or three young men this disorder was increased to a dangerous height, and became a true peripneumony, attended with bloody phlegm, and manifestly requiring frequent bleedings, by which they were much relieved. Towards the middle or end of this illness a few were attacked with intolerable stitches in their sides or loins, so that for two or three days they were confined almost to the same posture, and if they were necessitated to change it, they shewed all the marks of exquisite pain. Lighter cramps in the legs and arms were not uncommon at the going off of this malady.

I knew none who could properly be said to die of it; but it seemed to hasten the death of two or three persons, whom I found dying of age, and of other diseases.

The keeping quiet within doors, together with an abstinence from the grosser foods, and from heating liquors, was all which the generality of patients required. Small quantities of an opiate were very serviceable in allaying the incessant teasing of the cough, and in quieting the restlessness. Where the fever, or any of the symptoms, were

considerable, it appeared to me that bleeding was unquestionably useful, and lessened rather than increased the languor. In a few it was necessary, besides bleeding, to employ blisters, with the other usual remedies for inflammations of the lungs.

SIR GEORGE BAKER, Bart.

It is certain that many people, both in this town and its neighbourhood, were attacked by the epidemic disease some days preceding the 20th of October. As to the precise day when I first heard of it, I cannot speak of it with accuracy.

Men, confined by their business at home, suffered much less than those who were exposed to the air; and women, in general, less than men. Very young children were not much affected by this disease. Boys at school were almost universally disordered. Girls at school (I suppose on account of their greater confinement) were remarkably free from the influence of this constitution; at least, were not so generally attacked.

Many were suddenly seized with *great* giddiness and *intense* pain in the head; some with a considerable nausea, which sometimes continued several days. Some few had, in the beginning, successive rigors. An uncommon languor, restlessness, and anxiety, seemed to be the general characteristics of this disease.

I saw none whose first indisposition was a *diarrhœa*. Those who had a *diarrhœa*, had first complained of the common symptoms of a cold, which ceasing, a *diarrhœa* followed. This, in some, arose even to a dysentery.—They had almost constant pains a little above the navel, and a very frequent evacuation of thin excrement, mixed with mucus. This was my case in particular, and that of

several whom I visited, and many others, a relation of whose cases has been communicated to me.

Dr. Fothergill says, *the tongue was always white*. This seems too general an assertion: at least the contrary happened in several instances which fell under my notice.

The blood, in the beginning, was not always *sizy*; nor did I, in general, observe *the deep yellow serum* mentioned by Dr. Fothergill. Likewise *the cup-like appearance of crassamentum* was remarkable in several cases.

In many cases it was necessary to take away blood, even three or four times, on account of the violence of the pleuritic and peripneumonic symptoms.

Clysters, frequently injected, were of singular service.

The fever having sensibly remitted, according to my experience, the Peruvian bark was used with advantage. And likewise, when a languor and debility (as frequently happened) continued after the vehemence of the disease was subdued, this proved an useful remedy.

Many persons, even now, feel the effects of this disease; and I know several who are likely to die tabid.

Accounts received from France, Holland, and Germany, give us reason to conclude, that this epidemic was much more fatal in other countries than in this island. And I believe it will appear that it was more fatal in several distant countries than in this metropolis and its neighbourhood.

January, 1776.

DR. HENRY REVELL REYNOLDS.

My wife had this complaint on the 23d of October, and on the second of November I visited several patients who had laboured under it for some days.

All my children had it. The order in which the

symptoms appeared is as follows: watery eyes, swelling of the eye-lids, running from the nose, cough, diarrhœa: so that every part of the mucous membrane seemed to be progressively attacked. I saw two others affected in the same way.

In two instances I saw the tongue very dry, parched, and chopped. The patients were both corpulent women, aged between thirty and forty. At the time I was called in to them, they laboured under a true peripneumony; but I learned that they were first attacked with the catarrhal symptoms. Blood drawn from both these patients, even at the third bleeding, had a very thick buff coat, and exhibited the cup-like appearance.

Several whom I attended had this kind of diarrhœa; but I did not find it of service to any: on the contrary, I thought it prejudicial to some, as it seemed to prevent a free expectoration, which, to my apprehension, was the most critical and most salutary evacuation. Neither did warm copious sweats, though universal, (unless they happened before the seventh day) give that relief which one might have expected from them.

With respect to the method of cure, mine was nearly the same as yours, and in the same order. Permit me only to mention, that I found the Kermes mineral to answer my purpose exceedingly well, both as a diaphoretic and an expectorant. After several trials I preferred it to any other preparation of antimony.

In those cases where the diarrhœa was troublesome, I had recourse to the ipecacuanha in small doses; a grain of the powder, for instance, once in six hours; and it succeeded to my utmost wish, checking the diarrhœa, and promoting a free expectoration.

January 29, 1776.

S E C T. XXVI.

Paraphrenitis ; or, Inflammation of the Diaphragm.

This disease, according to Dr. Cullen, is not to be distinguished from *pneumonia*, for when the membrane of the diaphragm is inflamed, it communicates the same affection to the other membranes, and is only a more complicated case of pneumonia. Dr. Cullen disputes that it is accompanied,

1. With a raging delirium, like phrenitis.
2. Risus Sardonius, and
3. Other convulsive motions.

Dr. Cullen is therefore for dropping the distinction of this disease, as being a needless multiplication of terms, and would therefore wish to include carditis, pleuritis, peripneumony, and paraphrenitis, under one general term PNEUMONIA, or pneumonic inflammation.

S E C T. XXVII.

Gastritis ; or, Inflammation of the Stomach.

The signs of gastritis are,

1. Most acute pain in the stomach, always increased upon swallowing even the mildest kind of drink.
2. Inexpressible anxiety.
3. Great internal heat, something like heartburn, extending along the œsophagus.
4. Constant retching.
5. Frequent hiccup.
6. The pulse small, quick, and intermitting.
7. The debility extreme.

When a real inflammation once takes place in such a sensible part as the stomach, there must be very little chance for the patient's escape; for, unless the inflammation can be resolved in the very beginning, it almost constantly ends in a mortification, there being scarcely any room for suppuration, the part affected not having enough of the loose cellular texture, to admit that way of termination.

SECT. XXVIII.

Splenitis;† or, Inflammation of the Spleen.

The signs are,

1. A fixed, dull pain.
2. A soreness felt upon pressing the ribs most contiguous to the spleen.
3. An obscure remitting fever.

As an original disease, the Splenitis is exceedingly rare; but the spleen is frequently loaded in consequence of certain fevers, particularly the remittent, and often remains for a great length of time in the scirrhus or indolent state. Sometimes a suppuration takes place in this viscus, and that without much previous distress, or evident disorder, until, bursting all at once, the purulent matter is let loose among the abdominal viscera, and in a few days puts an end to the patient's life.

SECT. XXIX.

Hepatitis;† or, Inflammation of the Liver.

We now quit thoracic complaints, and proceed, in order,

† From σπλην, the spleen.

† From ηπαρ, the liver.

to inflammation of the parts contained within the abdomen, situate below the diaphragm.

The first we shall give a description of is the hepatitis.

The acute hepatitis is a very uncommon case in this climate, and may be distinguished by the following characters :

1. There is an acute pain at the top of the shoulder near the clavicle.
2. A dull obtuse pain just under the short ribs on the right side, extending to the back, and round to the shoulder.
3. The countenance appears sallow.
4. The pulse is quick and thready.
5. The patient cannot lie on the left side.
6. Pressing under the short ribs gives pain.
7. The breathing is painful and difficult.
8. There is a dry cough.
9. Sometimes great sickness and vomiting, and hiccup.

If the inflammation be not resolved, there is induced often a scirrhus state of this viscus, generally ending in dropsy, or an abscess is formed, which either bursts into the cavity of the abdomen at large, in which case death must inevitably ensue, as the sharp purulent matter will corrode the surfaces of the other viscera; or it pushes outwardly, and occasions a swelling, which sometimes points so as to be favourable for opening.

If it should happen that the liver, where it was inflamed, adheres all round to the peritonæum, so as to form a bag for the matter, and hinder it from falling into the cavity of the abdomen, then opening the abscess by a sufficiently large incision will probably save the patient's life; but if the adhesion to the peritonæum be imperfect, the matter will fall down between it and the liver into the cavity at

large, and the case will be as desperate as that which has been just now mentioned.

Sometimes the matter of an hepatic abscess comes away in the urine, and sometimes it is discharged by stool. When the matter comes off in the urine, we may conclude that it has been taken up by the branches of the vena cava, which are distributed through the liver, and thus carried back into the circulation, from whence it is separated by the kidneys. But when the pus comes off by stool, it must either have burst into the biliary ducts, and so have been carried by the ductus communis into the duodenum; or the abscess having been formed in the concave part of the liver, where it lies contiguous to the colon, must have adhered to this intestine, and burst into its cavity, from whence the matter will be discharged by stool, in a sudden and large flow, to the great and immediate relief of the patient.

SECT. XXX.

Epiploitis†; or, Inflammation of the Omentum.

This is a very uncommon disease, and may be known

1. By a sharp pain in the upper and forepart of the abdomen.
2. Tension and soreness upon pressure.
3. The usual signs of pyrexia, or inflammatory fever.

This inflammation, like the others, resolves itself or terminates in suppuration, when the matter bursting into the cavity of the abdomen, leaves the patient without hopes of recovery.

† From *επιπλοον*, the omentum.

SECT. XXXI.

*Peritonítis**; or, *Inflammation of the Peritonæum.*

The symptoms of this rare disease, perhaps only existing after delivery, are,

1. The extreme soreness felt all over the abdomen, it not bearing the least pressure.
2. General pyrexia.

SECT. XXXII.

Enterítis.†

The signs of enteritis are,

1. A tension of the belly.
2. Great internal pain.
3. So great external soreness about the navel as scarcely to bear the slightest touch.
4. Pyrexia.
5. The greatest debility.
6. A quick and thready pulse.

If the inflammation be not soon resolved, the enteritis terminates in gangrene in the course frequently of a few hours. People who die of a mortification in the intestines, feel no distress for ten or twelve hours before death, as the pain ceases entirely by that time, and they sink away, perfectly in their senses to the last minute; the sinking of the pulse, the pale ghastly look, and the cold clammy sweats, all teach us to foretel the fatal event, which the patients themselves are seldom aware of, but, from the ceasing of

* From *παιριτοναιον*, the peritonæum.

† From *εντερον*, the bowels.

the pain, are apt to conclude themselves in a way of recovery.

SECT. XXXIII.

Nephritis ; or, Inflammation of the Kidneys.*

The signs are,

1. Acute pain and heat in the small of the back.
2. Urine of a deep red colour and small in quantity, or colourless.
3. Retching to vomit.
4. Retraction of one of the testes not unfrequent.
5. A great numbness along the thigh.
6. The common symptoms of pyrexia.

It is distinguished from the lumbago by the vomiting, retraction of the testes, numbness, and by the patient being able to raise himself up without exciting severe pain.

A suppuration is often formed in the kidneys ; and we may conclude that it is so, when, notwithstanding the abatement of the pain, we still find the patient complain of a sense of weight in the lumbar region, while at the same time there are frequent shiverings, succeeded by hot fits, and the urine, from being red, and without sediment, comes to be whitish and turbid. As the purulent matter in these cases is speedily washed off, and carried away by the urine, it is not so liable to be absorbed, and hence it is, that people have been known to labour for many years under an ulcer of the kidneys, without being much affected by the hectic fever.

* From νεφς, a kidney.

SECT. XXXIV.

*Cystitis**; or *Inflammation of the Bladder.*

This disease is discriminated,

1. By a difficulty and total stoppage in making water.
2. Tenesmus.
3. Pyrexia.

SECT. XXXV.

Hysteritis†; or, *Inflammation in the Womb.*

1. Violent pain in that part.
2. Pyrexia.
3. Convulsion, or epilepsy.

This disease ends in suppuration, or a diseased secretion, commonly called a cancer of the womb.

SECT. XXXVI.

In sthenic disease we were able to trace each disorder to its source, and saw that to an increased action of the vascular system all the symptoms of disease were to be attributed. This was as the main spring of a watch, and the symptoms were as the index pointing to its state.

Happy should we be, if asthenic diseases could be traced to some general source, and the seat of each particular disorder be clearly ascertained. The imperfect state of medicine renders such an attempt not only very difficult, but hazardous. We will, however, attempt, as well as we are

* From *κυστις*, the bladder.

† From *μετρηξ*, the womb.

able, the order followed in the other assemblage of sthenic diseases.

SECT. XXXVII.

Mania† ; or, Wild Madness.

Insanity, so often the offspring of epilepsy, is one of the most terrific of human maladies. It is distinguished by the following signs :

1. There is, *sometimes*, a false perception, or imagination of things present, that are not ; but this not a constant attendant upon the disease.
2. The false judgment is *generally* on subjects long before laid up in the memory.
3. It very often turns upon one single subject ; but more commonly the mind rambles from one subject to another, with an equally false judgment concerning the most part of them ; and as, at the same time, there is commonly a false association, this increases the confusion of ideas, and therefore the false judgments.
4. What, for the most part, more especially distinguishes this disease, is a hurry of mind, in pursuing any thing like a train of thought, and in running from one train of thought to another.
5. Maniacal persons are, in general, very irascible ; but what more particularly produces their angry emotions is, that their false judgments lead to some action which is always pushed with impetuosity and violence ; when this is interrupted or restrained, they break out into violent anger and furious violence against every person near them, and upon every thing that stands in the way of their impetuous will.

† From *μνν*, the mind.

6. The false judgment often turns upon a mistaken opinion of some injury supposed to have been formerly received, or now supposed to be intended : and it is remarkable, that such an opinion is often with respect to their former dearest friends and relations ; and therefore their resentment and anger are particularly directed towards these.
7. And although this should not be the case they commonly soon lose that respect and regard which they formerly had for their friends and relations.
8. With all these circumstances, it will be readily perceived, that the disease must be attended very constantly with that incoherent and absurd speech we call raving.
9. Further, with the circumstances mentioned, there is commonly joined an unusual force in all the voluntary motions ; and an insensibility of resistance of the force of all impressions, and particularly a resistance of the powers of sleep, of cold, and even of hunger ; though, indeed, in many instances, a voracious appetite takes place.

All the species and degrees of madness which are hereditary, or which grow up with people from their early youth, are totally out of the power of physic ; and so, for the most part, are all maniacal cases of more than one year's standing, let them proceed from what source soever.

SECT. XXXVIII.

Melancholia†; or, Sorrowful Madness.

The melancholia we are about to consider, is different from that kind which alternates with mania ; for that

† From *μελας* black, and *χολη* bile.

mania which is attended with furious rage, often drops into sadness and fear, and the despondency and dejection is in exact proportion to the violence of the opposite paroxysm.

There is quite a different species of melancholia, where no furor is ever observed, and the patient sits,

1. In sullen and morose silence.
2. If loquacious, only talks of doubts and fears.
3. Whatever is presented, is imagined to be poison.
4. The head is generally reclined betwixt the knees, or nearly in that position.
5. The eye is inexpressive and heavy.
6. The countenance indicates disgust, rather than anger, when the person is disturbed.
7. The motion of the arms, when a change of position is made, is quick, and in some favourite posture.
8. Extreme costiveness.
9. Countenance very haggard.
10. Pulse slow and feeble.
11. Appetite often keen.
12. Emaciation.
13. A desire of suicide.

Both mania and melancholia often terminate in *amentia* idiotism†, marked by imbecility of intellect, by which the relation of things are either not perceived, or not recollected.

The accurate Morgagni has observed, that in maniacal persons the medullary portion of the brain is usually dry, hard, and firm: And this he had so frequently observed,

† Meckel, in his Anatomical Observations on Scirrhus Tumors and Ulcers of the Brain (*Histoire d'Acad. Royale des Sciences et Belles Lettres, Année 1760, à Berlin, 1761, 4.*) mentions the case of a fatuitous female, and ascribes the cause of the disease to a scirrhus gland which he found in the brain.

that he was disposed to consider it as generally the case. But in most of the particular instances which he has given, it appears, that, for the most part, while the cerebrum was of an unusually hard and firm consistence, the cerebellum was of its usual softness; and in many of the cases it was unusually soft and flaccid. In some other cases, Morgagni observes, that while a part of the cerebrum was harder and firmer than ordinary, other parts of it were preternaturally soft.

Meckel, in his *Anatomico-physiological Researches* into the causes of the various kinds of insanity which have their seat in the body, (See *Memoires de l'Académie Royale des Sciences et Belles Lettres*, Année 1764, á Berlin, 1766,) says he has discovered, by the most careful and accurate experiments, that the specific gravity of the brain of a maniac, or melancholic patient, is very different from the specific gravity of the brain of a sane person. A cube of six lines of the brain of a healthy man, weighed one drachm and four, or at the most, six grains, (some difference, however, is observed to arise from the different distention of the blood vessels). But in maniacs, and melancholic patients, the brain is generally harder, drier, and more elastic, and weighs specifically seven drachms. (*Memoires de l'Académie de Berlin*, tom. xx. p. 75). In addition to this generally diseased state of brain, (namely, the increased hardness, dryness, and elasticity,) particular or local alterations may also occur; as, for instance, the formation of stony matter in any part of the brain. Such diseases arise either from a congestion of lymph, or from sharp blood, and great determination of it to the head; or from compression of the brain, or from pus irritating the brain, or from an irritation of the nerves, called *par vagum*.

SECT. XXXIX.

*Insania** ; or, *Insanity*.

This is a species of madness the very opposite to melancholia, it consists in

1. Erroneous judgment from perception of imagination or recollection, attended with agreeable emotions in persons of a sanguine temperament.
2. It is accompanied with great pride ; persons of this description usually conceiting they are kings and queens.
3. And hence whatever is served up to them, they imagine a princely regale.
4. The language is incoherent.
5. And the conduct not unfrequently unruly.

A mild species of this is to be found in the aberration of men of genius.

I know a man, says Bonnet, of great respectability, strict veracity, a sound understanding, and a good memory, and faculty of judging, who, while quite awake, and without any external cause whatever, sees, at times, various figures of men and women, birds, chariots, buildings, &c. They appear to him to be in motion ; he sees them approach towards him, recede from him, and totally disappear. Mansions rise suddenly before his eyes with all their external and appropriate decorations. At times the appearance of the paper in his room seems at once to be changed, and, instead of the usual figures which are on it, a number of fine landscapes appear to his view. Some time after, not only all the landscapes and paper, but the furniture also disappear, and the bare walls present

* From *insania*, *insanity*.

themselves to his eyes. But I should lose myself in attempting to describe all these phœnomena; my object being solely to mention them. All these objects appear to him in such perfection, and make as strong an impression on him, as real objects. Subtil, p. 314. Bonnet adds, that the operation for the cataract had been successfully performed on him several years before this singular delusion commenced. At the time that Bonnet wrote the case, he says, that the left eye was almost useless, owing to the person's having greatly weakened it by too much reading, but the right one was tolerably good.

The following history is related by his biographer :

At Bisaccio, near Naples, Manso had an opportunity of examining the singular effects of Tasso's derangement, and often disputed with him concerning a familiar spirit, which he pretended conversed with him; Manso endeavoured in vain to persuade his friend that the whole was the illusion of a disturbed imagination; but the latter was strenuous in maintaining the reality of what he asserted, and to convince Manso, desired him to be present at one of the mysterious conversations. Manso had the complaisance to meet him next day, and while they were engaged in discourse, on a sudden he observed that Tasso kept his eyes fixed on a window, and remained, in a manner, immovable; he called him by his name, but received no answer; at last Tasso cried out, 'There is the friendly spirit that is come to converse with me; look! and you will be convinced of the truth of all that I have said.'

Manso heard him with surprise; he looked, but saw nothing except the sun-beams darting through the window; he cast his eyes all over the room, but could perceive nothing; and was just going to ask where the pretended spirit was, when he heard Tasso speak with great earnestness, sometimes putting questions to the spirit, sometimes

giving answers ; delivering the whole in such a pleasing manner, and in such elevated expressions, that he listened with admiration, and had not the least inclination to interrupt him. At last the uncommon conversation ended with the departure of the spirit, as appeared by Tasso's words, who, turning to Manso, asked him if his doubts were removed? Manso was more amazed than ever ; he scarce knew what to think of his friend's situation, and waved any further conversation on the subject.

Insanity often terminates in mania, or melancholia.

SECT. XL.

Hypochondriasis ; or, The Vapours.

This disease has two varieties :

1. An erroneous judgment, or imagination, producing some apprehension of evil, more especially respecting salvation, without a sufficient cause.
2. The same false idea respecting health, with present dissatisfaction.

This is a partial insanity of persons of a melancholic temperament. To explain which I must observe, that persons of a melancholic temperament are, for the most part, of a serious thoughtful disposition, and disposed to fear and caution, rather than to hope and temerity.—Persons of this cast are less moveable than others by any impressions ; and are, therefore, capable of a closer or more continued attention to one particular object, or train of thinking. They are even ready to be engaged in a constant application to one subject ; and are remarkably tenacious of whatever emotion they happen to be affected with.

These circumstances of the melancholic character, seem

clearly to show, that persons strongly affected with it, may be readily seized with an anxious fear; and that this, when much indulged, as is natural to such persons, may easily grow into a partial insanity.

There are many cases of this kind upon record by authors. A singular one is that of Mr. Simon Browne. He was a dissenting clergyman, of exemplary life, and eminent intellectual abilities; but having been seized with melancholy, he desisted from the duties of his function, and could not be persuaded to join in any act, either of public or of private worship. The reason which, after much importunity, he assigned for this change in his conduct, was, "that he had fallen under the displeasure of God, who had caused his rational soul gradually to perish, and left him only an animal life, in common with brutes: that it was therefore profane in him to pray, and improper to be present at the prayers of others." In this opinion he remained inflexible, at the time when all the powers of his mind seemed to subsist in full vigour; when his judgment was clear, and his reasoning strong and conclusive. For at this period, he published a defence of the *Religion of Nature*, and of the *Christian Revelation* in answer to *Tindal's Christianity as old as the Creation*: and the work is universally allowed to be the best, which that celebrated controversy produced. But in a dedication of it to Queen Caroline, which some of his friends found means to suppress, he displays the very extraordinary phrensy under which he laboured. Speaking of himself, he informs her Majesty, "that by the immediate hand of an avenging God, his very thinking substance has, for more than seven years, been continually wasting away, till it is wholly perished out of him, if it be not utterly come to nothing."

This remarkable and humiliating example of vigour

and imbecility, rectitude and perversion of the same understanding, I have related on the authority of Dr. Hawkesworth,† who has preserved the entire copy of the dedication, from which only a brief extract is here made. Our ignorance of the history of Mr. Browne renders it impossible to trace, to its source, this mental malady. But there is reason to presume, that it originated from some strong impression, and subsequent invincible association, connected with, or perhaps producing, a change in the organization of the brain. Perhaps, having acquired an early predilection for the writings of Plato, he might afterwards, in some season of hypochondriacal dejection, fall into the gloomy mysticism of the later followers of that amiable philosopher: for Plotinus, who flourished in the third century after the Christian æra, taught that the most perfect worship of the Deity consists, not in acts of veneration and of gratitude, but in a certain self-annihilation, or total extinction of the intellectual faculties.‡

I am inclined to believe, that the celebrated Paschal laboured under a species of insanity, towards the conclusion of his life, similar to that of Mr. Simon Browne. And, having hazarded such a surmise, it is incumbent on me to shew on what it is founded. This very extraordinary man discovered the most astonishing marks of genius in his childhood; and his progress in science was so rapid, that at the age of sixteen he wrote an excellent treatise on Conic Sections. He possessed such a capacious and retentive memory, that he is said “never to have forgotten any thing which he had learned.” And it was his practice to digest and arrange in his mind a whole series of reflections, before he committed them to writing.

† See the Adventurer.

‡ See Collier's Hist. Diet. Also Maclaurin's Account of Sir Isaac Newton's Discoveries, p. 397.

This power was at once so accurate and extensive, that he has been heard to deliver the entire plan of a work, of which he had taken no notes, in a continued narration, that occupied several hours. But it is related, by the editor of his *Thoughts on Religion and other Subjects*,† “that it pleased God so to touch his heart, as to let him perfectly understand, that the Christian religion obligeth us to live for God only, and to propose to ourselves no other object.” In consequence of this persuasion, he renounced all the pursuits of knowledge, and practised the most severe and rigorous mortifications; living in the greatest penury, and refusing every indulgence, which was not absolutely necessary for the support of life. It appears from some of his pious meditations, that this resolution of mind proceeded from the visitation of sickness. And the following solemn address to the Deity, clearly indicates an imagination perverted by the most erroneous associations.

“O Lord, thou gavest me health to be spent in serving thee, and I applied it to an use altogether profane. Now thou hast sent sickness for my correction. I know, O Lord, that at the instant of my death, I shall find myself entirely separated from the world, stripped naked of all things, standing alone before thee, to answer to thy justice concerning all the motions of my thoughts and spirits. Grant that I may look on myself as dead already, separated from the world, stripped of all the objects of my passion, and placed alone in thy presence.—I praise thee, O God, that thou hast been pleased to anticipate the dreadful day, by already destroying all things to my taste and thoughts, under this weakness, which I suffer from thy providence. I praise thee, that thou hast given me

† See the Preface to that work.

this divorce from the pleasures of the world." Was it consonant with soundness of understanding, for a man to take a sudden disgust at all the liberal studies, and innocent enjoyments, which had before engaged and gratified his mind? And was it not as much the fiction of a dis-tempered fancy, that God enjoined poverty, abstinence, and ignorance, to one possessing rank, fortune, and the noblest endowments of the mind, as the belief of Simon Browne, that he was divested of that rationality, which, at the same time, he so eminently displayed? Whenever false ideas, of a practical kind, are so firmly united, as to be constantly and invariably mistaken for truths, we very justly denominate this unnatural alliance, insanity. And, if it give rise to a train of subordinate wrong associations, producing incongruity of behaviour, incapacity for the common duties of life, or unconscious deviations from morality and religion, madness has then its commencement.

We come now to consider the second variety, which is often confounded with dyspepsia. It is marked by

1. A *very* particular attention to health.
2. To every, even the slightest feelings of the body.
3. And from any unusual feeling, even of the slightest kind, they apprehend great danger, and even death itself.
4. In respect to all these feelings and apprehensions, there is the most obstinate belief and persuasion, which cannot be shaken either by reasoning or ridicule.

The combination of vapours with dyspepsia is very frequent, and in seemingly very different circumstances. It is, especially, these different circumstances that I would wish to ascertain; and I remark that they are manifestly of two different kinds. First, as the disease occurs in

young persons of both sexes, in persons of a sanguine temperament, and of a lax and flaccid habit. Secondly, as it occurs in elderly persons of both sexes, of a melancholic temperament, and of a firm and rigid habit.

These two different cases of the combination of vapours and dyspepsia, I consider as two distinct diseases, to be distinguished chiefly by the temperament prevailing in the persons affected.

As the dyspepsia of sanguine temperaments is often without vapours; and, as the vapours, when joined with dyspepsia, in such temperaments, may be considered as, perhaps, always a symptom of the affection of the stomach; so to this combination of dyspepsia and vapours, I would still apply the appellation of dyspepsia, and consider it as strictly a disease, which will be treated of presently.

But the combination of dyspepsia and vapours in melancholic temperaments, as the vapours or the turn of mind peculiar to the melancholic temperament, are essential circumstances of the disease; and, as this turn of mind is often with few, or only slight symptoms of dyspepsia; and, even though the latter be attending, as they seem to be rather the effects of the general temperament, than of any primary or topical affection of the stomach; I consider this combination as a very different disease from the former, and would apply to it strictly the appellation of Hypochondriasis.

Having thus pointed out a distinction between Dyspepsia and Hypochondriasis, I shall now, using these terms in the strict sense above-mentioned, make some observations which may, I think, illustrate the subject, and more clearly and fully establish the distinction proposed.

The dyspepsia often appears early in life, and is frequently much mended as life advances: but the hypo-

chondriasis seldom appears early in life, and more usually in more advanced years only; and more certainly still, when it has once taken place, it goes on increasing as life advances to old age.

This seems to be particularly well illustrated, by our observing the changes in the state of the mind which usually take place in the course of life. In youth, the mind is cheerful, active, rash, and moveable: but, as life advances, the mind, by degrees, becomes more serious, slow, cautious, and steady; till at length, in old age, the gloomy, timid, distrustful, and obstinate state of melancholic temperaments is more exquisitely formed. In producing these changes, it is true, that moral causes have a share; but it is at the same time obvious, that the temperament of the body determines the operation of these moral causes, sooner or later, and in a greater or lesser degree, to have their effects. The sanguine temperament retains longer the character of youth, while the melancholic temperament brings on more early the manners of old age.

Upon the whole, it appears, that the state of the mind which attends, and especially distinguishes, hypochondriasis, is the effect of that same rigidity of the solids, torpor of the nervous power, and peculiar balance between the arterial and venous systems which occur in advanced life, and which at all times take place more or less in melancholic temperaments. If, therefore, there be also somewhat of a like state of mind attending the dyspepsia, which occurs early in life in sanguine temperaments and lax habits, it must depend upon a different state of the body, and probably upon a weak and moveable state of the nervous power.

Agreeable to all this in dyspepsia, there is more of spasmodic affection, and the despondency of the mind is

often absent, and, when present, is perhaps, always of a slighter kind; while in hypochondriasis the affection of the mind is more constant, and the symptoms of dyspepsia, or the affections of the stomach, are often absent, or when present, are in a slighter degree.

I believe the affection of the mind is commonly different in the two diseases. In dyspepsia, it is often languor and timidity only, easily dispelled; while in hypochondriasis, it is generally the gloomy and rivetted apprehension of evil.

The two diseases are also distinguished by some other circumstances. Dyspepsia, as I have said, is often a symptomatic affection; while hypochondriasis is, perhaps, always a primary and idiopathic disease.

As debility may be induced by many different causes, dyspepsia is a frequent disease; while hypochondriasis, depending upon a particular temperament, is more rare.

It is now proper to consider in what this melancholic temperament especially consists; and to this purpose, it may be observed, that in it there is a degree of torpor in the motion of the nervous power, both with respect to sensation and volition; and there is a general rigidity of the simple solids; and that the balance of the sanguiferous system is upon the side of the veins. But all these circumstances are the directly opposite of those of the sanguine temperament; and must therefore, also produce an opposite state of mind.

It is this state of mind, and the state of the brain corresponding to it, that is the chief object of our present consideration. But what that state of the brain is, will be supposed difficult to explain; and it may, perhaps, seem rash in me to attempt it.

I will, however, venture to say, that it is probable the melancholic temperament of mind depends upon a drier

and firmer texture in the medullary substance of the brain; and that this perhaps proceeds from a certain want of fluid in that substance, which appears from its being of a lesser specific gravity than usual. That this state of the brain in melancholia does actually exist, I conclude, first, from the general rigidity of the whole habit; and, secondly, from dissections, showing such a state of the brain to have taken place in mania, which is often no other than a higher degree of melancholia. It does not appear to me anywise difficult to suppose, that the same state of the brain may, in a moderate degree, give melancholia; and in a higher, that mania which melancholia so often passes into; especially, if I shall be allowed further to suppose, that either a greater degree of firmness in the substance of the brain may render it susceptible of a higher degree of excitement, or that one portion of the brain may be liable to acquire a greater firmness than others, and consequently give occasion to that inequality of excitement which so much characterises the present disease.

SECT. XLI.

Apopléxia and Páralysis†; or, Palsy.*

Apoplexy, in all its different degrees, most commonly affects persons advanced in life, and especially those above sixty years of age. It most usually affects persons of large heads and short necks, persons of a corpulent habit, persons who have passed an indolent life and used a full diet, and especially those who have indulged in frequent

* From *απο* and *λησσω*, to strike down.

† From *παράλυω*, to loose.

intoxication. Men, who have long laboured under a frequent and copious discharge of blood from the hemorrhoidal vessels, upon either the suppression or spontaneous ceasing of that discharge, are particularly liable to be affected with apoplexy.

This disease frequently comes on very suddenly: but in many cases it is preceded by various symptoms, such as,

1. Frequent fits of giddiness.
2. Frequent head-aches.
3. Some transitory interruption of seeing and hearing.
4. False vision and sometimes hearing.
5. A sense of numbness and tingling in the extremities.
6. Shedding of tears without a sufficient assignable cause.
7. Some faltering in the tongue.
8. Frequent drowsiness.
9. Loss of memory.
10. Faculties impaired.
11. Lowness of spirits.

An attention to these symptoms, and to the predisponent circumstances, will often enable us to foresee and hinder the more violent attacks of this disease.

When the disease comes on suddenly to a considerable degree, it has been frequently observed to have been immediately induced by violent exercise; by a full and long-continued inspiration; by a fit of anger; by much external heat, especially that arising from a crowded assembly of people; by warm bathing; by intoxication; by long stooping with the head down; and by a tight ligature about the neck. The disease has been remarked to make its attacks most frequently in the spring season, and especially when the vernal heat suddenly succeeds to the winter cold. In short, it is produced by whatever determines the blood to the head.

The fit itself is marked by the following symptoms:

1. There is a sudden privation of all the powers of sense and voluntary motion, often without any indication of its approach.
2. The patient falls down.
3. The mouth is usually drawn on one side.
4. The joints remain flexible, and
5. The muscles remain flaccid.
6. The person is seemingly in a profound sleep.
7. Often it is accompanied with stertor, or sonorous breathing, or loud snoring.

Dissections of subjects who die of this disease, for the most part, shew, that the brain has been oppressed, and this may be produced in different ways, as

1. By external violence fracturing and pressing in a part of the cranium.
2. By tumours, sometimes soft, sometimes bony, formed in different parts of the brain, or in its membranes, and becoming of such a bulk as to compress the medullary substance of the brain.
3. By the blood accumulated in the blood-vessels of the brain, and distending them to such a degree as to compress the medullary portion of the same.
4. By fluids effused in different parts of the brain, or into the cavity of the cranium, and accumulated in such quantity as to occasion the compression we treat of.

And, as to this last, it is to be remarked here, that the fluids effused may be of two kinds: that is, they may be either a portion of the common mass of blood, poured out from red vessels; or a portion of serum or colourless fluid, poured out chiefly by exhalents.

This produces the distinction of two kinds in medical writings.

I. The *apoplexia sanguinea*,

1. Which is supposed to attack more suddenly than the *serosa*, being
2. Without much previous oppression,
3. Or unusual sleepiness.
4. The face appears red and flushed.
5. The veins turgid.
6. The eyes half open, but not transparent.
7. The respiration tolerably free,
8. Though accompanied with snoring, or rattling in the throat.
9. The pulse full and strong.

II. The *apoplexia serosa*

1. Is apt to be preceded by an unusual heaviness,
2. Giddiness, and
3. Drowsiness.

And after the stroke,

4. The face is not remarkably red nor flushed.
5. The veins are not turgid,
6. The respiration is more straitened,
7. And there is more of the rattling and snoring.
8. With a working of froth from the mouth.
9. The pulse is not strong, nor remarkably full, and inclines to intermit.

There have been instances where an apoplectic fit has wrought itself off by an effort of nature; and where a profuse spitting, a bleeding at the nose, or a plentiful diarrhœa, have saved life: but, in general, the patients depend on art for their preservation.

If the patient can be brought to himself within the first four days, there may be hopes of a complete recovery, and we are to settle a proper scheme of conduct for the pre-

vention of future attacks ; but if there be no remarkable amendment within the time above-mentioned, there is but little hope of shaking off the disease, which will either destroy life immediately, or terminate in an incurable palsy, for the most part.

Palsy is a disease consisting in a loss of the power of voluntary motion, but affecting certain parts of the body only, and by this it is distinguished from apoplexy. One of the most frequent forms of palsy is, when it affects the whole of the muscles on one side of the body ; and then the disease is named a *Hemiplegia*.

In the most violent degrees of palsy, the patient loses both the power of motion and sense of feeling, either of one side, or of the lower half of the body. The first case is termed *Hemiplegia*,* the latter *Paraplegia*.†

The most common species is the hemiplegia ; and this is usually the consequence of an apoplectic stroke. It is not uncommon to see patients live for several years in the paralytic state, especially if it be the hemiplegia : and even in the paraplegia, if death does not ensue within the first two or three weeks, it may not take place for a considerable time.

The hemiplegia usually begins with, or follows, a paroxysm of apoplexy ; and when the hemiplegia, after subsisting for some time, becomes fatal, it is commonly by passing again into the state of apoplexy. The relation, therefore, or affinity between the two diseases, is sufficiently evident ; and is further strongly confirmed by this, that the hemiplegia comes upon persons of the same constitution, and is preceded by the same symptoms that have been taken notice of with respect to apoplexy.

It is a promising circumstance in paralytic cases, when

* From *ημιον*, half, and *πλεσσω*, to strike.

† From *παρα*, across, and *πλησσω*, to strike.

the patient feels a light degree of painful itchiness in the affected parts; and if a fever should arise, it bids fair to remove the palsy.

When the sense of feeling remains, there is much more room to hope for a perfect recovery, than in cases where the powers both of motion and sensation are lost; but when we observe the flesh to waste, and the skin to appear withered and dry, we may look on the disease as quite incurable. The palsy sometimes ends in a mortification; and convulsions, for the most part, coming on before death, puts an end to the misery of the patient.

The *carus* is a most profound and quiet sleep, protracted beyond the natural and healthy period, from which the patient cannot be roused.

The *lethargy* is an imperfect apoplexy, or *carus*; wherein the patient may be roused, but immediately falls asleep again.

There is no great necessity for making more distinctions of the palsy than those above-mentioned; if the reader is desirous of seeing more, he may consult Sauvage.

SECT. XLII.

*Epilépsia**; or, *Epilepsy*.

The *Epilepsy* differs from a convulsion, in its being accompanied with total insensibility; in its returning periodically, though not always at regular intervals; and in its being a chronic disease, that often lasts for a number of years without destroying life.

The general form or principal circumstances of this disease, are much the same in all the different persons whom it affects. It comes by fits, which often attack persons seemingly in perfect health; and, after lasting for

* From *ἐπιλέψω*, a swoon.

some time, pass off, and leave the persons again in their usual state. These fits are sometimes preceded by certain symptoms, which, to persons who have before experienced such a fit, may give notice of its approach, as we shall hereafter explain; but even these preludes do not commonly occur long before the formal attack, which, in most cases, comes on suddenly, without any such warning.

Persons afflicted with the Epilepsy

1. Fall down suddenly, deprived of all sense, like those who are struck with an apoplexy, but they do not, like these, lie quiet, as if in a profound sleep. On the contrary,
2. The whole muscular system is agitated by such violent convulsive motion, that it is scarcely possible for the bye-standers to keep the persons afflicted from hurting themselves.
3. Commonly the limbs on one side of the body are more violently or more considerably agitated than those of the other.
4. In all cases the muscles of the face and eyes are much affected, exhibiting various and violent distortions of the countenance.
5. The tongue is often thrust out of the mouth, while the muscles of the face and eyes are much affected, exhibiting various and violent distortions of the countenance.
6. And from the action of the muscles of the lower jaw, the tongue is often grievously bit.
7. Generally, after no long time, the convulsions of the limbs, trunk of the body, and face, cease, when the person remains without motion, insensible, and as if asleep.

The total loss of sense, and the froth that issues from the mouth during the convulsions, are what distinguishes the

true epilepsy ; and, by attending to this circumstance, we may always be able to know whether the disease be counterfeited ; which impostors in military hospitals, and vagabonds, to extort charity, are often found to do ; these may be detected, by applying somewhat extremely stimulating to the nostrils, such as the strongest spirit of sal ammoniac : or by slightly puncturing some very sensible part.

It is generally supposed, that the change and full of the moon have some influence in bringing on the fits ; this, however, is much to be doubted ; but it is certain, that excesses of every kind, whether in respect of diet, exercise, or the passions of the mind, are extremely apt to accelerate the return of the paroxysm.

Few diseases are more capable of being transmitted from parents to their offspring than the epilepsy ; it has also been known to take its rise from severe frights during the earlier periods of life. Dr. Locker, physician to the hospital of St. Mark, at Vienna, relates, that out of fourteen epileptic patients in that house, he found there were six of them wherein the disease had ensued from fright ; one case, wherein it appeared to be the consequence of a blow on the head ; another, where it arose from a sudden stoppage of the courses ; but in the remaining six, the source could not be traced to any external cause.

If an epilepsy, which was begun during childhood, does not go off upon the changes that happen in the constitutions of both sexes about the age of puberty, we may consider it as likely to endure for the remainder of life.

The dissection of epileptic subjects has shewn a variety of morbid appearances, which may be supposed to have contributed to the disease ; such as, indurations in the brain or meninges : caries of the internal surface of the cranium ; projections of the bony substance of the cranium,

pressing upon the brain; collections of serum, or purulent matter, and earthy concretions within the scull; besides many others which are recorded by Bonetus, Morgagni, and Lieutaud.

SECT. XLIII.

Catalépsia; * or, *Catalepsy*.

Of all the nervous or spasmodic disorders, there is none more surprising than catalepsy. In this the patient becomes,

1. Wholly insensible of every thing passing; and
2. Remains exactly in the same posture in which he was first seized.
3. His joints are so stiff, that they can scarcely be bent, or, if they are, they remain in every situation they are placed.
4. The pulse is slow and irregular.

A very surprising case of this disorder is given by the learned Dr. John Jebb; it is as follows,—

In the latter end of the last year, I was desired to visit a young lady, who, for nine months, had been afflicted with that singular disorder, termed a catalepsy. Although she was prepared for my visit, she was seized with the disorder as soon as my arrival was announced. She was employed in netting, and was passing the needle through the mesh: in which position she immediately became rigid, exhibiting, in a very pleasing form, a figure of death-like sleep, beyond the power of art to imitate, or the imagination to conceive. Her forehead was serene, her features perfectly composed. The paleness of her colour, her breathing at a

* From *καταληψις*, a seizure.

distance being also scarce perceptible, operated in rendering the similitude to marble more exact and striking. The position of her fingers, hands, and arms, was altered with difficulty; but they preserved every form of flexure they acquired; nor were the muscles of the neck exempted from this law; her head maintaining every situation, in which the hand could place it, as firmly as her limbs.

Upon gently raising the eyelids, they immediately closed, with a degree of spasm. The iris contracted upon the approach of a candle, as in a state of vigilance; the eyeball itself was slightly agitated with a tremulous motion, not discernible when the eye-lid had descended.

About half an hour after my arrival, the rigidity in her limbs and statue-like appearance being yet unaltered, she sung three plaintive songs, in a tone of voice so elegantly expressive, and with such affecting modulation, as evidently pointed out how much the most powerful passion of the mind was concerned in the production of her disorder, as indeed her history confirmed. In a few minutes afterwards she sighed deeply, and the spasm in her limbs was immediately relaxed. She complained that she could not open her eyes, her hands grew cold, a general tremor followed; but, in a few seconds, recovering entirely her recollection and powers of motion, she entered into a detail of her symptoms, and the history of her complaints.

She informed me, that she had no recollection whatever of what passed in the fits; that upon coming out of them she felt fatigue, in proportion to the time of their continuance; and that they sometimes lasted for five hours, though generally for a much shorter period.

She further related, that the fits returned once or twice a day, sometimes more frequently; but that she never was troubled with them in the night. She sometimes lost her

sight and speech, the power over her limbs, and her intellectual faculties remained unimpaired. The fits frequently attacked her without any previous warning ; at other times, a fluttering at her stomach, and a fixed pain at the top of her head, occupying a part which she could cover with her finger, announced their approach.

Hysterical risings in her throat, appearances of fire, pains in her eyes, and not unfrequently in her teeth, flatulence, a sense of weight in her stomach after eating, with convulsive motions in the region of that organ, were superadded symptoms, of which she much complained.

Her disorder was evidently exasperated at the approach of the catamenia, which were constantly present at the regular period. She was always much agitated previously to a storm of thunder ; and every material alteration of the weather produced a sensible effect.

After she had discoursed for some time with apparent calmness, the universal spasm suddenly returned. Her features now assumed a different form, denoting a mind strongly impressed with anxiety and apprehension. At times she uttered short and vehement exclamations, in a piercing tone of voice, expressive of the passions that agitated her mind ; her hands being strongly locked in each other, and all her muscles, those subservient to speech excepted, being affected with the same rigidity as before.

During the time of my attendance, similar appearances were frequently exhibited.

I was informed, by the family, of many particularities in the access of the disorder, all denoting its instantaneous effect upon the nervous system. She once was seized in my presence while drinking tea, and became universally rigid, at the instant she was bringing the tea-cup to her

mouth. Her tears sometimes flowed copiously, while every internal, as well as external sense, seemed intirely locked up in sleep.

The existence of this disease has been often denied. But the author of this work, himself, saw a case of catalepsy in St. Thomas's Hospital.

The patient was a young woman, daughter of a tradesman, who was alarmed in the middle of the night with the general cry of fire, and found herself surrounded with the flames. Having had the courage, after the first horrid fright, to hurry on a few of her clothes; she was but little scorched. On every side she heard

"Speed the quick step, nor turn the ling'ring eye!"

Onward she moves—loud horror roars behind,

And shrieks of anguish bellow in the wind;

With many a sob, amid a thousand fears,

The beauteous wand'rer pours her gushing tears;

She flies, she stops, she pants, she looks behind,

And hears a demon howl in ev'ry wind.

As the bleak blast unfurls her flutt'ring vest,

Cold beats the snow upon her shudd'ring breast;

Through her numb'd limbs the chill sensations dart,

And the keen ice-bolt trembles at her heart—

"I sink, I fall—oh! help me, help!" she cries,

Her stiff'ning tongue th' unfinished sound denies;

Tear after tear, a-down her cheeks succeeds,

As pearls of ice bestrew the glitt'ring meads;

Congeeing snows her ling'ring feet surround,

Arrest her flight, and root her to the ground;

With suppliant arms she pours the silent pray'r,

Her suppliant arms hung crystal in the air;

Pellucid films her shiv'ring neck o'erspread,

Seal her mute lips, and silver o'er her head;

Veil her pale bosom, glaze her lifted hands,

And shrin'd like ice the beauteous statue stands."

DARWIN.

The patient, after experiencing three or four of the same fits, was brought to St. Thomas's Hospital. Here

it was agreed, among twelve of the students, to watch the approach of these extraordinary fits in turn, and then to communicate the information to the others.

As she was sitting one evening, about nine o'clock, on a bench in the hospital, seemingly well, she was suddenly attacked, and stiffened in that posture. She was put immediately to bed by the nurse, and her legs were straightened. She lay not, however, as a corpse, but as one enchanted. Her breathing was so soft as only to be perceptible to a glass; every feature was placid, and there was a peculiar glow over her whole countenance, which was extremely fair. Her eyes, which were large, and of a soft blue, were wide open*, and shone very bright. The same still stiffness continuing for a length of time, infused an indescribable sensation. In whatever position we put the arms, they remained the same. The fingers when pointed, continued so; and when clasped, rested rigidly firm. She was wholly insensible to the loudest noise. In dropping some hartshorn near the nostril, the hand of the student failed him, and more than was intended fell into that part. There was immediately a movement of the head, expressive of pain, with the motion of a muscle of the face, on that side; several large tears dropt from the eyes, but so rigid were the eyelids, that they were not closed, but continued still wide open. After remaining in this state above an hour, she fetched a deep breath, sighed several times, looked with some surprise around her, drooped her head, felt languid, was given somewhat to drink, and recovered, insensible of what had passed, only she perceived her nostril flayed, and it gave her pain.

Catalepsy, if not cured, ends either in mania, or apoplexy.

* In this, the case differed materially from Dr. Jebb's.

SECT. XLIV.

Tétanus, or Locked Jaw.*

1. This disease sometimes comes on suddenly to a violent degree, but more generally it approaches by slow degrees to its violent state.
2. In this case it attacks with a sense of stiffness in the back-part of the neck, which gradually increasing, renders the motion of the head difficult and painful.
3. As the rigidity of the neck comes on and increases, there is commonly at the same time a sense of uneasiness felt about the root of the tongue; which, by degrees, creates a difficulty of swallowing, and at length an entire interruption of it.
4. While the rigidity of the neck goes on increasing, there arises a pain, often violent, at the lower end of the sternum, and from thence shooting into the back.
5. When this pain arises, all the muscles of the neck, and particularly those of the back part of it, are immediately affected with spasm, pulling the head strongly backwards.
6. At the same time, the muscles that pull up the lower jaw, which upon the first approaches of the disease were affected with some spastic rigidity, are now generally affected with more violent spasm, and set the teeth so closely together, that they do not admit of the smallest opening. This is what has been named the *Locked Jaw*, and is often the principal part of the disease.

* From τριζω, to gnash.

7. When the disease has advanced thus far, the pain at the bottom of the sternum returns very frequently, and with it the spasms of the hind-neck and lower jaw are renewed with violence and much pain.
8. As the disease thus proceeds, a greater number of muscles come to be affected with spasms.
9. After those of the neck, those along the whole of the spine become affected, bending the trunk of the body strongly backwards; and this is what has been named the *Opisthótonos*.
10. In the lower extremities, both the flexor and extensor muscles are commonly at the same time affected, and keep the limbs rigidly extended.
11. Though the extensors of the head and back are usually the most strongly affected, yet the flexors, or those muscles of the neck that pull the head forward, and the muscles that should pull down the lower jaw, are often at the same time strongly affected with spasm.
12. During the whole of the disease, the abdominal muscles are violently affected with spasm, so that the belly is strongly retracted, and feels hard as a piece of board.
13. At length the flexors of the head and trunk become so strongly affected as to balance the extensors, and to keep the head and trunk straight, and rigidly extended, incapable of being moved in any way; and it is to this state the term of *Tétanus* has been strictly applied.
14. At the same time, the arms, little affected before, are now rigidly extended; the whole of the muscles belonging to them being affected with spasms, except those that move the fingers, which often to the last retain some mobility.

15. The tongue also long retains its mobility ; but at length it also becomes affected with spasms, which, attacking certain of its muscles only, often thrust it violently out between the teeth.
16. At the height of the disease, every organ of voluntary motion seems to be affected ; and amongst the rest, the muscles of the face.
17. The forehead is drawn up into furrows, the eyes, sometimes distorted, are commonly rigid, and immoveable in their sockets ; the nose is drawn up, and the cheeks are drawn backwards towards the ears, so that the whole countenance expresses the most violent grinning.
18. After these universal spasms, a violent convulsion commonly comes on, and puts an end to the poor tortured being.

SECT. XLV.

Somnambulismus ; or, Walking in one's Sleep.

The patient

1. Has eyes wide open, but sees nothing.
2. He exercises his mind with recollection.
3. His walks are to some particular spot, which, when done, he appears composed, and sleeps quiet the remainder of the night.

SECT. XLVI.

Relaxatio Uvulæ ; or, Relaxation of the Uvula.

In the order we proceed now to the *throat*, and are to consider,

1. The falling down, or elongation of the uvula.

2. A sense of tickling in the fauces.

3. And soreness at the root of the tongue.

Pulling up a middle lock in the head, so as to raise the scalp, elevates the uvula by a motion this creates in the mouth, and without examination proves the disease.

SECT. XLVII.

Raucédo; or, Hoarseness.

It is generally symptomatic of cold, and often comes on towards evening in consumptions, sometimes it is an idiopathic disease, and continues extremely obstinate.

SECT. XLVIII.

Globus Hystéricus, or Hysterical Ball.

This is symptomatic of the disease called hysteria, and consists in a spasm occupying the two extremities of the œsophagus, embracing in the middle a quantity of air, which can neither be expelled backwards nor forwards, and gives the unpleasant sensation of immediate suffocation.

SECT. XLIX.

We descend now to the contents of the thorax, and proceed in order to the diseases affecting that part, and first we will consider,

Hæmoptysis, or Spitting of Blood.*

The blood-vessels of the lungs are more numerous than those of any other part of the body of the same bulk.

* From αἷμα, blood, and πῆζω, to spit.

These vessels, of the largest size, as they arise from the heart, are more immediately than in any other part subdivided into vessels of the smallest size; and these small vessels spread out near to the internal surfaces of the bronchial cavities, are situated in a loose cellular texture, and covered by a tender membrane only: so that, considering how readily and frequently these vessels are gorged with blood, we may understand why an hemorrhagy from them is, next to that of the nose, the most frequent of any.

1. This disease usually comes on with a sense of weight and anxiety in the chest, some uneasiness in breathing, some pain of the breast or other parts of the thorax, and some sense of heat under the sternum; and very often, before the disease appears, a saltish taste is perceived in the mouth.
2. Immediately before the appearance of blood, a degree of irritation is felt at the top of the larynx.
3. To relieve this, a hawking is made, which brings up a little blood, of a florid colour, and somewhat frothy.
4. The irritation returns; and, in the same manner, more blood of a like kind is brought up, with some noise in the windpipe, as of air passing through a fluid.

This is commonly the manner in which the hemoptysis begins; but sometimes at the very first the blood comes up by coughing, or at least somewhat of coughing accompanies the hawking just now mentioned.

The blood issuing is sometimes at first in very small quantity, and soon disappears altogether: but, in other cases, especially when it repeatedly occurs, it is in greater quantity, and frequently continues to appear at times for several days together. It is sometimes profuse; but rarely in such quantity as either by its excess, or by its sudden

suffocation, to prove immediately mortal. It commonly either ceases spontaneously, or is stopped by the remedies employed.

When blood is thrown out from the mouth, it is not always easy to determine from what internal part it proceeds; whether from the internal surface of the mouth itself, from the fauces, or adjoining cavities of the nose, from the stomach, or from the lungs. It is, however, very necessary to distinguish the different cases; and, in most instances, it may be done by attending to the following considerations.

When the blood spit out, proceeds from some part of the internal surface of the mouth itself, it comes out without any hawking or coughing, and generally upon inspection, the particular source of it becomes evident.

When blood proceeds from the fauces, or adjoining cavities of the nose, it may be brought out by hawking, and sometimes by coughing, in the manner we have described; so that, in this way, a doubt may arise concerning its real source. A patient often lays hold of these circumstances to please himself with the opinion of its coming from the fauces, and he may be allowed to do so; but a physician cannot readily be deceived, if he consider, that a bleeding from the fauces is more rare than one from the lungs; that the former seldom happens but to persons who have been before liable either to an hemorrhagy of the nose, or to some evident cause of erosion; and, in most cases, by looking into the fauces, the distillation of the blood, if it comes from thence, will be perceived.

When blood proceeds from the lungs, the manner in which it is brought up will commonly show from whence it comes: but, independent of that, there are many circumstances which may concur to point it out, such as the period of life, the habit of body, and other marks of a

predisposition; and, together with these, the occasional causes having been immediately before applied.

When vomiting accompanies the throwing out of blood from the mouth, as vomiting and coughing often mutually excite each other; so they may be frequently joined, and render it doubtful, whether the blood thrown out proceeds from the lungs or from the stomach. We may, however, generally decide, by considering, that blood does not so frequently proceed from the stomach as from the lungs: that blood proceeding from the stomach commonly appears in greater quantity, than when it proceeds from the lungs: that the blood proceeding from the lungs is usually of a florid colour, and mixed with a little frothy mucus only; whereas, the blood from the stomach is commonly of a darker colour, more grumous, and mixed with the other contents of the stomach: that the coughing or vomiting, according as the one or the other first arises in the cases in which they are afterwards joined, may sometimes point out the source of the blood; and, lastly, that much may be learned from the circumstances and symptoms which have preceded the hemorrhagy.

Those which precede the hemoptysis, are most of them evident marks of an affection of the lungs. And, on the other hand, the hematemesis, or issuing of blood from the stomach, has also its peculiar symptoms and circumstances preceding it; as, for instance, some morbid affection of this organ, or at least some pain, anxiety, and sense of weight, referred distinctly to the region of the stomach. To all this may be added, that the vomiting of blood happens more frequently to females than to males; and to the former, in consequence of a suppression of their menstrual period: and by attending to all these considerations, the presence of the hemoptysis may, I think, be sufficiently ascertained.

That this disorder is mostly, if not always, asthenic, only consider whom it affects ; consider also the exciting noxious powers, and the symptoms. During the whole period of the predisposition the patients are delicate and weakly ; they have very little appetite, and what food they take is ill digested, and often rejected by vomiting. In this weak state they are not supported by the stimulant operation of corporeal, or mental exercise ; nor by that of high spirits, for they are quite dejected ; nor by that of pure air, which they are not able to go out to take ; nor by that of agreeable sensation ; nor by that of strong liquors, which from the wrong advice of their physicians, they look upon as poison ; nor by that of the distention of the vessels, for these are not sufficiently filled with blood.

This disorder, if not followed by a speedy termination, usually brings on a cough, ending in a true phthisis pulmonalis, one of the most insidious and fatal of our diseases, which we are next to consider.

SECT. L.

Phthisis Pulmonalis, or Pulmonary Consumption.*

This disease, as appears from dissection, generally arises from suppurating tubercles.

Tubercles, says the late Dr. Stark, are found, on dissection of those who have died of this disease, of all sizes, from the smallest granules to the bigness of a horse-bean, and commonly in clusters. On cutting into them, they appear of a white, smooth, cartilaginous substance. In the smallest, no cavity or opening appears ; in those farther advanced, on the cut surface we discover small pin

* From *φθίω*, to consume.

holes ; in those still larger are one or more cavities containing a fluid-like pus ; which being cleared off, in the bottom is perceived several small openings or holes ; through which, on pressing the turbercle, matter issued, similar to that contained in its cavity. The larger tubercles, when emptied of their contents, appear like a small capsula, into which entered a branch of the wind-pipe,

This disease, when arising from tubercles,

1. Usually commences with a slight and short cough, which becomes habitual, is often little remarked by those affected, and sometimes so little as to be absolutely denied by them.
2. At the same time their breathing becomes easily hurried by any bodily motion, their body grows leaner, and they become languid and indolent.
3. This state sometimes continues for a year, or even for two years, without persons making any complaint of it, excepting only that they are affected by cold more readily than usual, which frequently increases their cough, and produces some catarrh. This again, however, is sometimes relieved ; is supposed to have arisen from cold alone : and therefore gives no alarm either to the patient or to his friends, nor leads them to take any precautions.
4. Upon one or other of these occasions of catching cold, as we commonly speak, the cough becomes more considerable ; is particularly troublesome upon the patient's lying down at night, and in this state continues longer than is usual in the case of a simple catarrh. This, more especially, should call for attention, if the increase and continuance of cough come on during the summer season.
5. The cough, which comes on as has been just now described, is very often for a long time without any

expectoration ; but when, from repeatedly catching cold, it becomes more constant, it is then, at the same time, attended with some expectoration, which is most considerable in the mornings.

6. The matter of this expectoration becomes by degrees more copious, more viscid, and more opaque ; at length of a yellow or greenish colour, and of a purulent appearance*.

* It has sometimes happened, that a catarrh was attended with an expectoration of a matter so much resembling pus, that physicians have been often uncertain whether it was mucus or pus, and therefore whether the disease was a catarrh or phthisis. It is often of consequence to determine these questions ; and it appears to me that it may be generally done, with sufficient certainty, from the following considerations, of which each particular is not always singly decisive, but when they are taken together, can hardly deceive us.

1. From the colour of the matter ; as mucus is naturally transparent, and pus always opaque. When mucus becomes opaque, as it sometimes does, it becomes white, yellow, or greenish ; but the last-mentioned colour is hardly ever so remarkable in mucus as in pus.

2. From the consistence ; as mucus is more viscid, and coherent, and pus less so, and may be said to be more friable. When mucus is thrown into water, it is not readily diffused, but remains united in uniform and circular masses ; but pus, in the same circumstances, though not readily diffused, does not remain so uniformly united, and by a little agitation is broken into ragged fragments.

3. From the odour, which is seldom perceived in mucus, but frequently in pus. It has been proposed to try the odour of the matter expectorated, by throwing it upon live coals ; but in such a trial both mucus and pus give out a disagreeable smell, and it is not easy to distinguish between them.

4. From the specific gravity compared with water ; and, indeed, it is usual for the mucus of the lungs to swim on the surface of water, and for pus to sink in it. But in this we may sometimes be deceived, as pus which has entangled a great deal of air, may swim, and mucus that is free from air may sink.

5. From the mixture which is discernible in the matter brought up ; for if a yellow or greenish matter appears surrounded with a quantity of transparent or less opaque and less coloured matter, the more strongly coloured

7. The whole of the matter, however, is not always at once entirely changed in this manner; but while one part of it retains the usual form of mucus, another suffers the changes now described.
8. When the cough increases, and continues very frequent through the night, and when the matter expectorated undergoes the changes I have mentioned, the breathing at the same time becomes more difficult, and the emaciation and weakness go on also increasing.
9. In the female sex, as the disease advances, and sometimes early in its progress, the menses cease to

matter may be generally considered as pus; as it is not easy to understand how one portion of the mucus of the lungs can be very considerably changed, while the rest of it is very little so, or remains in its ordinary state.

6. From the admixture of certain substances with the matter thrown out from the lungs. To this purpose we are informed by the experiments of the late very ingenious Mr. Charles Darwin: *a.* That the vitriolic acid dissolves both mucus and pus, but most readily the former: That, if water be added to such a solution of mucus, this is separated, and either swims on the surface, or divided into flocculi, is suspended in the liquor; whereas, when water is added to a like solution of pus, this falls to the bottom, or by agitation is diffused so as to exhibit an uniformly turbid liquor. *b.* That a solution of the caustic fixed alkali, after some time, dissolves mucus, and generally pus; and, if water be added to such solutions, the pus is precipitated, but the mucus is not. From such experiments it is supposed, that pus and mucus may be certainly distinguished from each other.

7. From the expectoration's being attended with a hectic fever. A catarrh, or expectoration of mucus, is often attended with fever; but never, so far as I have observed, with such a fever as I am presently to describe as a hectic. This, in my opinion, is the most certain mark of a purulent state in some part of the body; and if others have thought differently, I am persuaded that it has been owing to this, that, presuming upon the mortal nature of a confirmed or purulent phthisis, they have considered every case in which a recovery happened, as a catarrh only; but that they may have been mistaken in this, will be shown hereafter.

flow; and this circumstance is to be considered as commonly the effect, although the sex themselves are ready to believe it the sole cause of the disease.

10. When the cough comes, as before described, the pulse is often natural, and for some time after continues to be so; but the symptoms have seldom subsisted long before the pulse become frequent, and sometimes to a considerable degree, without much of the other symptoms of fever.
11. At length, however, evening exacerbations become remarkable; and by degrees the fever assumes the exquisite form of hectic.
12. A hectic fever has the form of a remittent, which has exacerbations twice every day.
13. The first of these occurs about noon, sometimes a little sooner or later; and a slight remission of it happens about five in the afternoon.
14. This last is soon succeeded by another exacerbation, gradually increasing till after midnight; but after two o'clock in the morning, a remission takes place, which becomes more and more considerable as the morning advances.
15. The exacerbations are frequently attended with some degree of cold shivering; or, at least, the patient is exceedingly sensible to any coolness of the air, seeks external heat, and often complains of a sense of cold, when, to the thermometer, his skin is preternaturally warm. Of these exacerbations, that of the evening is always the most considerable.

It has commonly been given as a part of the character of a hectic fever, that an exacerbation of it commonly appears after the taking food; and it is true that dinner, which is

taken at noon, or after it, does seem to occasion some exacerbation.

But this must not make us judge the mid-day exacerbation to be the effect of eating only; for I have often observed it to come on an hour before noon, and often some hours before dinner; which, in this country at present, is not taken till some time after noon.

It is indeed to be observed, that in almost every person, the taking food occasions some degree of fever: but I am persuaded this would not appear so considerable in a hectic, were it not that an exacerbation of fever is present from another cause; and accordingly, the taking food in the morning has hardly any sensible effect.

I have thus described the general form of hectic fever; but many circumstances attending it, are further to be taken notice of.

16. The fever I have described does not commonly subsist long, till the evening exacerbations become attended with sweatings; which continue to recur and to prove more and more profuse, through the whole course of the disease.
17. Almost from the first appearance of the hectic, the urine is high-coloured, and deposits a copious branny red sediment, which hardly ever falls close to the bottom of the vessel.
18. In the hectic, the appetite for food is generally less impaired than in any other kind of fever.
19. The thirst is seldom considerable; the mouth is commonly moist; and as the disease advances, the tongue becomes free from all fur, appears very clean; and in the advanced stages of the disease, the tongue and fauces appear to be somewhat inflamed, and become more or less covered with aphthæ.

20. As the disease advances, the red vessels of the adnata of the eye disappear, and the whole of the adnata becomes of a pearly white.
21. The face is commonly pale; but, during the exacerbations, a florid red, and an almost circumscribed spot, appear on each cheek.
22. For some time, in the course of a hectic, the belly is bound; but in the advanced stages of it, a diarrhœa almost always comes on, and continues to recur frequently during the rest of the disease, alternating, in some measure, with the sweatings mentioned above.
23. The disease is always attended with a debility, which gradually increases during the course of it.
24. During the same course an emaciation takes place, and goes to a greater degree than in almost any other case.
25. The falling off of the hairs, and the adunque form of the nails, are also symptoms of the want of nourishment.
26. Towards the end of the disease, the feet are often affected with œdemátous swellings.
27. The exacerbations of the fever are seldom attended with any head-ache, and scarcely ever with delirium.
28. The senses and judgment commonly remain entire to the very end of the disease; and the mind, for the most part, is confident and full of hope.
29. Some days before death, a violent purging comes on, the legs swell, the cough stops, the matter is accumulated, and the patient dies suffocated.

The Rev. William Gorsuch, by keeping a register for ten years, at Shrewsbury, discovered that the number of

deaths from consumption was, in his parish, somewhat more than one in four. By favour of a friend, I possess, says the philanthropic Dr. Beddoes, the abstract of a similar register for one of the parishes in Bristol, where the pastor has been commendably attentive to the enumeration of his flock. By enquiry from house to house, he found the population to be about 10,000. The following table shews the mortality, registered under the heads *decline* and *consumption*. But it is to be observed, that the same sources of inaccuracy exist here as in the London accounts. The persons (mostly of the lower class) who report the deaths, refer every complaint of slow progress, and attended with emaciation, to consumption or decline. Consequently, the number under this head is greater than of those whom real phthisis pulmonalis cuts off. Many also are interred at different burying-places, and of course not registered. But there is no reason why the latter circumstance should be supposed to affect the proportions.

<i>Years.</i>	<i>Total Deaths.</i>	<i>By Consumption or Decline.</i>
1790	158	56
1791	202	104
1792	215	90
1793	235	107
1794	213	108
1795	215	127
1796	216	91
	<hr/> 1511 <hr/>	<hr/> 683 <hr/>

What may be collected from private practice, does not, I believe, in any respect, tend to invalidate the conclusion deducible from these statements.

The disease is seen sometimes to perform an operation

more severe than that of decimation, leaving alive one or two members only out of a large family. I was not long since consulted for a phthisical girl, who had lost six (that is to say, all) her brothers and sisters in the same way. There lies before me a letter, describing the phthisical symptoms of a young person (the last of his name) and containing a list of father, mother, two sisters, and a first cousin, who, in consequence of similar attacks, had followed one another to the grave in the space of about five years. These are far from being all the instances I have known; and scarce a physician of moderate experience but must have met with instances equally deplorable.

Could a general assembly of British parents be convened for the mutual communication of family disasters, originating in this source, how many thousands might, with very little variation, adopt the language of Nestor, when he speaks of the havoc occasioned among the Greeks, by the war at Troy!

———— καλεκταθεν ὅσσοι ἀριστοί·
 Ἐνθα μὲν Ἄϊας κείλει ἀρηϊός, ἔνθα δ' Ἀχιλλεύς,
 Ἐνθα δὲ Πάτροκλος, θεοφιν μῆνως ἀταλαίης
 Ἐνθα δ' ἐμὲς φίλος υἱός. —————

Shall I the dire distressful scenes review;
 And open all a parent's grief anew?
 Trace the long roll of death, and, sorrowing, tell
 How, mark'd by fate, the best and loveliest fell?

- - - - -
 - - - - -
 There Ajax huge, Achilles there the brave,
 And young Patroclus found an early grave;
 There too my child—————

The fatality and frequency of consumption are better understood than its severity. Writers of romance (whether

from ignorance, or because it suits the tone of the narrative) exhibit the slow decline of the consumptive as a state on which the fancy may agreeably repose, and in which not much more misery is felt than is expressed by a blossom, nipped by untimely frosts. Those who only see the sufferers in passing, are misled by the representation. And I have heard many persons thus prepossessed, after closely attending a sick friend, declare their surprise not less than their horror, at the unexpected scenes of varied and protracted misery which they have been condemned to witness.

To lead the imagination through some of these scenes, might have its use in creating a salutary alarm. But I feel myself totally unequal to the task. I do not speak, says Dr. Beddoes, of the difficulty of noting down the obvious sensible tokens by which the calm practitioner of medicine may recognise the complaint in its various stages—this is easy enough, and authors do it every day, as monks count their bead-roll—but of the difficulty of bringing out all the patient's feelings into distinct relief, and delineating a picture which a parent, fresh from the loss of a child, shall acknowledge.

Consumption is thus elegantly and feelingly described by Dr. Beddoes, the short teasing cough at first, provoked by incessant tickling in the throat, as if the minute fragment of some extraneous body had immoveably fixed itself there; the subsequent hard rending cough, attended sometimes by retching and vomiting, sometimes by stitches which necessitate the most violent struggle against the continued solicitation to cough, and severely punish a moment of inattention; the expectoration sometimes nauseous, always offensive to the eye, and harassing when it is not free; the languor with which the patient finds himself overpowered, when his attention is not occupied by

some among his various fixed or flying pains; the extremes of cold and heat through which he is carried by the daily returns of hectic; the sweats in which his repose by night drenches him; the breathlessness on motion or without motion, arising by degrees to a sense of drowning, and terminating in actual drowning, when there is no longer strength to bring up the fluids, secreted in the chest; the disorder in the bowels, towards the last always threatening, and finally unrestrainable, while it cuts off those indulgencies which the very thirst it creates or aggravates, impatiently demands: these are but a part of the torments under which the physician, during his transient visit, in an immense majority of instances, sees the consumptive labouring. And what are the few minutes of a physician's call, compared to the whole twenty-four hours, lengthened out as they often are to the tenants of the sick chamber, by pain and incapability of amusement on one side, and by tender concern on the other?

Into the catalogue of evils flowing from any cause, those that affect the bye-standers should be received, as well as those that affect the principal party. Thus in the early stage of consumption, how painful must it be to perceive female delicacy, vainly struggling against an increasing and inexorable disease, and to have the avowal extorted partly by affectionate urgency, partly by distress! After the full disclosure is made, how horrible (according to circumstances and the character of the medical attendant) for the parent to listen to his frank explanation, to search for the hidden meaning of the looks, or to pierce through the clumsy dissimulation! The despondence which (whatever is said to the contrary) the sick not unfrequently express, is miserable. The sanguine hope which an hour of sunshine commonly excites, is more miserable still. What is worst perhaps, is the knowledge of the patient's

insecurity, during these intervals of ease! The storm of symptoms, that has so often broken in at once upon the most apparent settled calm, allowing the watchful friends no respite from their anxiety. And how shocking at last (under a consciousness that the event will give the heart a blow from which it can never fully recover) to be driven to call upon death to close the long series of sufferings!

SECT. L.

*Dyspnœa**; or, *Difficulty of Breathing.*

The exercise of respiration, and the organs of it, have so constant and considerable a connection with almost the whole of the other functions and parts of the human body, that upon almost every occasion of disease, respiration must be affected. Accordingly, some difficulty and disorder in this function are in fact symptoms very generally accompanying disease. It is, however, more particularly symptomatic of inflammation of the lungs and chlorosis.

We must therefore distinguish between symptomatic and idiopathic affections; that is, between those difficulties of breathing, which are symptoms only of a more general affection, or of a disease subsisting primarily in other parts than the organs of respiration, and that difficulty of breathing which depends upon a primary affection of the lungs themselves.

It is usually the sequel of other diseases, and arises from rupture of the air-cells, or adhesion preventing a free exercise of the lungs.

* From *δυσ*, difficult, and *πνέω*, to breathe.

SECT. LI.

Dyspnœa Pituitosa. Pituitous Asthma.

This is catarrhus senilis of Sydenham ; it comes on

1. With a humid cough frequent in winter, but which disappears in summer.
2. The breathing is difficult upon using of exercise.
3. The lungs always appear oppressed.
4. After a time the cough is equally teasing both winter and summer.

It ends in hydrothorax, when it may be known,

1. By the pale bloated looks of the patient.
2. Swelled legs.
3. Small quantity of water.
4. Anxiety.
5. Oppressed pulse.
6. And blueness of the lips.

The dyspnœa calculosa, arises from earthy concretions formed in the lungs. The spitting up of such concretions, with the difficulty of breathing, alone discloses the disease.

Or it terminates in Phthisis.

SECT. LII.

Hydrothōrax ; or, Water in the Chest.*

The preternatural collection of serous fluid in the thorax, to which we give the appellation of *Hydrothorax*, occurs more frequently than has been imagined. Its pre-

* From ὕδωρ, water, and θώραξ, the breast.

sence, however, is not always to be very certainly known at the onset; and it often takes place to a considerable degree before it is discovered.

These collections of watery fluids in the thorax, are found in different situations. Very often the water is found at the same time in both sacs of the pleura, but frequently in one of them only. Sometimes it is found in the pericardium alone; but for the most part it only appears there when at the same time a collection is present in one or both cavities of the thorax. In some instances, the collection is found to be only in that cellular texture of the lungs which surrounds the bronchiæ, without there being at the same time any effusion into the cavity of the thorax.

Pretty frequently the water collected consists chiefly of a great number of hydatids in different situations; sometimes seemingly floating in the cavity, but frequently connected with, and attached to, particular parts of the internal surface of the pleura.

From the collection of water being thus in various situations and circumstances, symptoms arise which are different in different cases; and from thence it becomes often difficult to ascertain the presence and nature of the affection. I shall, however, endeavour here to point out the most common symptoms, and especially those of that principal and most frequent forms of the disease, when the serous fluid is present in both sacs of the pleura, or, as we usually speak, in both cavities of the thorax.

1. The disease frequently comes on with a sense of anxiety, about the lower part of the sternum.
2. This, before it has subsisted long, comes to be joined with some difficulty of breathing; which at first appears only upon the person's moving a little faster than usual, upon his walking up an acclivity,

or upon his ascending a stair-case: but after some time, this difficulty of breathing becomes more constant and considerable, especially during the night, when the body is in an horizontal situation.

3. Commonly, at the same time, lying upon one side is more easy than upon the other, or perhaps lying upon the back more easy than upon either side.
4. These circumstances are usually attended with a frequent cough, that is at first dry; but which, after some time, is accompanied with an expectoration of thin mucus. With all these symptoms, the hydrothorax is not certainly discovered, as the same symptoms often attend other diseases of the breast.
5. When, however, along with these symptoms, there is at the same time an œdematous swelling of the feet and legs, a leucophlegmatic paleness of the face, and a scarcity of urine, the existence of a hydrothorax can be no longer doubtful. Whilst the presence of the disease is somewhat uncertain, there is a symptom which sometimes takes place, and has been thought to be a certain characteristic of it; and that is,
6. When, soon after the patient has fallen asleep, he is suddenly awakened with a sense of anxiety and difficult breathing, and with a violent palpitation of the heart. These feelings immediately require an erect posture; and very often the difficulty of breathing continues to require and to prevent sleep for a great part of the night.
7. Soon after this disease has made some progress, the pulse commonly becomes irregular, and frequently intermitting.

S E C T. LIII.

Angína Pectoris.*

Dr. Heberden was the first who described this disease, though it is extremely dangerous, and, by his account, not very rare. It seizes those who are subject to it when they are walking, and particularly when they walk soon after eating,

1. With a most disagreeable and painful sensation in the breast, which seems to threaten immediate destruction: but the moment they stand still, all the uneasiness vanishes.
2. In all other respects the patients at the beginning of this disorder are well, and have no shortness of breath; from which the *angina pectoris* is totally different.
3. After it has continued some months, the fits will not cease instantaneously on standing still; and it will come on not only when the patients are walking, but when they are lying down, and oblige them to rise up out of their beds every night for many months together.
4. In one or two very inveterate cases, it has been brought on by the motion of a horse or carriage, and even by swallowing, coughing, going to stool, speaking, or by any disturbance of mind. The persons affected were all men, almost all of whom were above fifty years of age, and most of them with a short neck, and inclining to be fat. Something like it, however, was observed in one woman,

* From *αγγειν*, to strangle.

who was paralytic; and one or two young men complained of it in a slight degree. Other practitioners have observed it in very young persons.

When a fit of this sort comes on by walking, its duration is very short, as it goes off almost immediately upon stopping. If it comes on in the night, it will last an hour or two. Dr. Heberden met with one in whom it once continued for several days; during all which time the patient seemed to be in imminent danger of death. Most of those attacked with the distemper died suddenly: though this rule was not without exceptions; and Dr. Heberden observed one who sunk under a lingering illness of a different nature.

The *os sterni* is usually pointed to as the seat of this malady; but it seems as if it was under the lower part of that bone, and at other times under the middle or upper part, but always inclining more to the left side; and in many cases there is joined with it a pain about the middle of the left arm, which appears to be seated in the biceps muscle.

The appearance of Dr. Heberden's paper in the Medical Transactions very soon raised the attention of the faculty, and produced other observations from physicians of eminence: namely, Dr. Fothergill, Dr. Wall of Worcester, Dr. Haygarth of Chester, and Dr. Percival of Manchester. It also induced an unknown sufferer under the disease to write Dr. Heberden a very sensible letter, describing his feelings in the most natural manner; which, unfortunately, in three weeks after the date of this anonymous epistle, terminated in a sudden death, as the writer himself had apprehended.

The youngest subject that Dr. Fothergill ever saw afflicted with this disorder, was about thirty years of age; and this person was cured. The method that succeeded

with him was a course of pills, composed of the mass of gum pill, soap, and native cinnabar; with a light chalybeate bitter; this was continued for some months, after which he went to Bath several successive seasons, and acquired his usual health; he was ordered to be very sparing in his diet; to keep the bowels open; and to use moderate exercise on horseback, but not to take long or fatiguing walks.

The only symptom in this patient that is mentioned, was a stricture about the chest, which came on if he was walking up hill or a little faster than ordinary, or if he was riding a very brisk trot; for moderate exercise of any kind did not affect him; and this uneasy sensation always obliged him to stop, as he felt himself threatened with immediate death, if he had been obliged to go forward.

It is the sharp constrictive pain across the chest that (according to Dr. Fothergill's observation,) particularly marks this singular disease; and which is apt to supervene upon a certain degree of muscular motion, or whatever agitates the nervous system.

In such cases as fell under the inspection of Dr. Fothergill, he very seldom met with one that was not attended with an irregular and intermitting pulse; not only during the exacerbations, but often when the patient was free from pain and at rest; but Dr. Heberden observes, that the pulse is, at least sometimes, not disturbed; and mentions his having once had an opportunity of being convinced of this circumstance, by feeling the pulse during the paroxysm.

But no doubt these varieties, as well as many other little circumstances, will occur in this disease, as they do in every other, on account of the diversity of the human frame; and if those, which in general are found to predo-

minate and give the distinguishing character, be present, they will always authorise us in giving the name to the disease; thus, when we find the constrictory pain across the chest, accompanied with a sense of strangling or suffocation; and still more, if this pain should strike across the breast into one or both arms; we should not hesitate to pronounce the case an *angina pectoris*.

As to the nature of this disease, it appears to be purely spasmodic: and this opinion will readily present itself to any one who considers the sudden manner of its coming on and going off: the long intervals of perfect ease; the relief afforded by wine, and spirituous cordials; the influence which passionate affections of the mind have over it; the ease which comes from varying the posture of the head and shoulders, or from remaining quite motionless; the number of years for which it will continue, without otherwise disordering health; its bearing so well the motion of a horse or carriage, which circumstance often distinguishes spasmodic pains from those which arise from ulcers: and lastly, its coming on for the most part after a full meal, and in certain patients at night, just after the first sleep, at which time the incubus, convulsive asthma, and other ills, justly attributed to the disordered functions of the nerves, are peculiarly apt to return or to be aggravated.

From all these circumstances taken together, there can be little doubt that this affection is of a spasmodic nature; but though it should be admitted, that the whole distress in these cases arise from spasm, it may not be so easy to ascertain the particular muscles which are thus affected.

The violent sense of strangling or choaking, which shews the circulation through the lungs to be interrupted during the height of the paroxysm; and the peculiar con-

strictive pain under the sternum, always inclining (according to Dr. Heberden's observation) to the left-side; together with that most distressing and alarming sensation, which, if it were to increase or continue, threatens an immediate extinction of life; might authorise us to conclude that the heart itself is the muscle affected; the only objection to this idea, and, if it had been constantly observed, it would be insurmountable, is, that the pulse is not always interrupted during the paroxysm. The appearance in two of the dissections, favours the opinion that the spasm affects the heart*; as in one subject the left ventricle (and, though it be not mentioned, we may presume the right one also) was found as empty of blood as if it had been washed; and in another, the substance of the heart appeared whitish, not unlike a ligament; as it should seem, in both cases, from the force of the spasm, squeezing the blood out of the vessels and cavities.

If this hypothesis be allowed, we must conclude that the spasm can only take place in an inferior degree, as long as the patient continues to survive the paroxysm; since an affection of this sort, and in this part, of any considerable duration or violence, must inevitably prove fatal; and accordingly, as far as could be traced, the persons who have been known to labour under this disease in general died suddenly.

But dissections also shew, that whatever may be the true seat of the spasm, it is not necessary for the bringing of it on, that the heart, or its immediate appendages, should be in a morbid state; for in three out of the six that have as yet been made public, these parts were found in a sound state.

On opening the body of the poor gentleman who wrote

* If so, it would resemble the cases recorded Vol. I. p. 378, of our fifth edition.

the letter to Dr. Heberden, "upon the most careful examination, the heart, with its vessels and valves, were all found in a natural condition."

In the case communicated by Dr. Percival to the publishers of the Edinburgh Medical Commentaries, "the heart and aorta descendens were found in a sound state." And in Dr. Haygarth's patient, "on opening the thorax, the lungs, pericardium, and heart, appeared perfectly sound." Not to mention Dr. Fothergill's patient (R. M.) in whose body the only morbid appearance about the heart was a small white spot near the apex. So that the cause, whatever its nature might have been, was at too great a distance, or of too subtile a nature, to come under the inspection of the anatomist. But there was a circumstance in two of the subjects that is worthy of remembrance, and which shews that the crisis of the blood, while they were living, must have been greatly injured, namely, its not coagulating, but remaining of a cream-like consistence, without any separation into serum and crassamentum.

SECT. LIV.

Asthma.*

In conformity with common notions, I have considered asthma as a disorder of the lungs, for if it were considered as an affection more properly of the diaphragm, it then would come after palpitation of the heart, which I have treated of under the title syncope, although it may be considered as distinct, and symptomatic of a defective stimulation, as is seen in breathing of mephitic air, and in chlorosis, and other diseases marked with a defective oxygenation of the blood. Some writers would incline one to

* From *ασθμαζειν*, to breathe with difficulty.

make it a symptom of a peculiar disease of the stomach, as the Rev. Mr. Townsend, but in whatever light it be considered, it may occupy, with great propriety, its present place.

The asthma is a chronic disease, which may continue to give very great distress, at intervals, for a considerable number of years. Sir John Floyer, when he wrote his treatise on this disease, had laboured under repeated paroxysms for thirty years.

The common distinction is into the

1. Humid, and
2. Dry.

The former is accompanied with an expectoration of mucus, or purulent matter, but the latter is not so attended.

1. This disease is frequently hereditary.
2. It seldom appears very early in life, and hardly till the time of puberty, or after it.
3. The attacks of this disease are generally in the night time, or towards the approach of night; but there are also some instances of their coming on in the course of the day,
4. At whatever time they come on, it is, for the most part, suddenly, with a sense of tightness and stricture across the breast, and a sense of straitness in the lungs impeding respiration.
5. The person thus attacked, if in a horizontal situation, is immediately obliged to get into somewhat of an erect posture, and requires a free and cool air.
6. The difficulty of breathing goes on for some time increasing; and both inspiration and expiration are performed slowly, and with a wheezing noise.
7. In violent fits, speaking is difficult and uneasy.

8. There is often some propensity to coughing, but it can hardly be executed.
9. These symptoms often continue for many hours together, and particularly from midnight till the morning is far advanced.
10. Then commonly a remission takes place by degrees; the breathing becomes less laborious and more full, so that the person can speak and cough with more ease; and if the cough brings up some mucus, the remission becomes immediately more considerable, and the person falls into a much wished-for sleep.
11. During these fits the pulse often continues in its natural state; but in some persons the fits are attended with a frequency of pulse, and with some heat and thirst, as marks of some degree of fever.
12. If urine be voided at the beginning of a fit, it is commonly in considerable quantity and without colour or odour; but, after the fit is over, the urine voided is in the ordinary quantity, of a high colour, and sometimes deposits a sediment.
13. In some persons, during the fit, the face is a little flushed and turgid; but more commonly it is somewhat pale and shrunk.
14. After some sleep in the morning, the patient, for the rest of the day, continues to have more free and easy breathing, but it is seldom entirely such. He still feels some tightness across his breast, cannot breathe easily in a horizontal posture, and can hardly bear any motion of his body, without having his breathing rendered more difficult and uneasy.
15. In the afternoon he has an unusual flatulency of his

stomach, and an unusual drowsiness; and very frequently these symptoms precede the first attacks of the disease; but, whether these symptoms appear or not, the difficulty of breathing returns towards the evening; and then sometimes gradually increases, till it becomes as violent as in the night before; or, if, during the day, the difficulty of breathing has been moderate, and the person got some sleep in the first part of the night, he is, however, waked about midnight, or at sometime between midnight and two o'clock in the morning; and is then suddenly seized with a fit of difficult breathing, which runs the same course as the night before.

16. In this manner fits return for several nights successively, but generally, after some nights passed in this way, the fits suffer more considerable remissions.
17. This especially happens when the remissions are attended with a more copious expectoration in the mornings; and that this continues from time to time throughout the day. In these circumstances asthmatics, for a long time after, have not only more easy days, but also enjoy nights of entire sleep, without the recurrence of the disease.

When this disorder, however, has once taken place in the manner above described, it is ready to return at times for the rest of life.

Changes of weather are usually felt very sensibly by asthmatic people, who in general cannot live with tolerable ease in the atmosphere of large cities; though we shall sometimes meet with patients who agree better with this air, which is so loaded with gross effluvia of various kinds,

than with the purest that can be found in country situations.

When the asthma is found to depend on some other disease, whether it be the gout or intermittent fever, or when it proceeds from the striking in of some cutaneous eruption, regard must always be had to the primary disease: thus, in the *asthma arthriticum*, sinapisms to the feet, or blistering, will be absolutely necessary, in order, if possible, to bring on a fit of the gout. And when the dregs of an ague give rise to an asthma, which is termed *Febricosum*, and invades at regular intervals, we must have recourse to the cortex.

Asthma generally terminates in Hydrothorax, or Phthisis Pulmonalis.

SECT. LV.

In order, we proceed now to the stomach, the source of a vast variety of symptoms, or what have by some medical writers been accounted as so many diseases, all which we shall include under the general term

*Dyspépsia** ; or, *Indigestion*.

It is characterised by

1. A pallid countenance.
2. A want of appetite.
3. Frequent squeamishness.
4. Eructations of wind.
5. Acid eructations.
6. Distention of the stomach.

* From *δυσ*, bad, and *πέψιν*, to concoct.

7. Pain at the pit of the stomach, felt especially upon any pressure.
8. The pain on the left side, distinguishing it from pleurisy, with
9. The pulse slow, and small.
10. Great depression of spirits.
11. Costiveness.
12. The lower extremities extremely cold, from spasms of the crura of the diaphragm obstructing the blood in its descent, and determining to the head: hence,
13. Flushes of heat in the face.
14. Beatings of the temporal artery.
15. Giddiness.
16. Hysteria, or temporary insanity.
17. Convulsions.
18. Vomiting of a fluid like coffee.
19. A sudden and great flux of pale urine.
20. A dry hecking nervous cough.
21. Horrid dreams, generally of precipices.
22. It is sometimes attended with a flow of water from the mouth.*

The imbecility of the stomach, and the consequent symptoms, may, however, frequently depend upon some organic affection of the stomach itself, as tumor, ulcer, or schirrosity; or upon some affection of other parts of the body communicated to the stomach, as in gout, amenorrhœa, and some others. In all these cases, however, the dyspeptic symptoms are to be considered as secondary or sympathetic affections, to be cured only by removing the primary disease. Such secondary and sympathetic cases can-

* This, by Cullen, has been considered as denoting a distinct disease, called by him, *Pyrosis*.

not, indeed, be treated of here; but, as I presume that the imbecility of the stomach may often take place without either any organic affection of this part, or any more primary affection, in any other part of the body; so I suppose and expect it will appear, from the consideration of the remote causes, that the dyspepsia may be often an idiopathic affection, and that it is therefore properly taken into the system of methodical Nosology, and becomes the subject of our consideration here.

There can be little doubt that, in most cases, the weaker action of the muscular fibres of the stomach, is the most frequent and chief cause of the symptoms mentioned; but I dare not maintain it to be the only cause of idiopathic dyspepsia. There is, pretty certainly, a peculiar fluid in the stomach of animals, or at least a peculiar quality in the fluids, that we know to be there, upon which the solution of the aliments taken into the stomach chiefly depends: and it is at the same time probable, that the peculiar quality of the dissolving or digesting fluids may be variously changed, or that their quantity may be, upon occasion, diminished. It is therefore sufficiently probable, that a change in the quality or quantity of these fluids may produce a considerable difference in the phenomena of digestion, and particularly may give occasion to many of the morbid appearances mentioned.

This seems to be very well founded, and points out another proximate cause of dyspepsia beside that we have already assigned: but, notwithstanding this, as the peculiar nature of the digestive fluid, the changes which it may undergo, or the causes by which it may be changed, are all matters so little known, that I cannot found any practical doctrine upon any supposition with respect to them; and as, at the same time, the imbecility of the stomach, either as causing the change in the digestive

fluid, or as being induced by that change, seems always to be present, and to have a great share in occasioning the symptoms of indigestion; so I shall still consider the imbecility of the stomach as the proximate and almost sole cause of dyspepsia. And I the more readily admit of this manner of proceeding; as, in my opinion, the doctrine applies very fully and clearly to the explaining the whole of the practice which experience has established as the most successful in this disease.

Considering this, then, as the proximate cause of dyspepsia, I proceed to mention the several remote causes of this disease, as they are such as, on different occasions, seem to produce a loss of tone in the muscular fibres of the stomach. They may, I think, be considered under two heads, the *first* is, of those which act directly and immediately upon the stomach itself: the *second* is, of those which act upon the whole body, or particular parts of it, but in consequence of which the stomach is chiefly or almost only affected.

Of the first kind are,

1. Certain sedative or narcotic substances taken into the stomach, such as tea, coffee, tobacco, ardent spirits, opium, bitters, aromatics, putrids, and acescents.
2. The large and frequent drinking of warm water, or of warm watery liquids.
3. Frequent surfeit, or immoderate repletion of the stomach.
4. Frequent vomiting, whether spontaneously arising, or excited by art.
5. Very frequent spitting, or rejection of saliva.

Those causes which act upon the whole body, or upon particular parts and functions of it, are,

1. An indolent and sedentary life.

2. Vexation of mind, and disorderly passions of any kind.
3. Intense study, or close application to business too long continued.
4. Frequent intoxication; which partly belongs to this head, partly to the former.
5. The being much exposed to moist and cold air when without exercise.

Though this disease, as proceeding from the last set of causes, may be considered as a symptomatic affection only; yet, as the affection of the stomach is generally the first, always the chief, and often the only, effect which these causes produce or discover, I think, the affection of the stomach may be considered as the disease to be attended to in practice; and the more properly so, as in many cases the general debility is only to be cured by restoring the tone of the stomach, and by remedies first applied to this organ.

It remains now to be observed, that violent or long continued complaints of the stomach, often terminate in an apoplexy, palsy, jaundice, dropsy, tympany, or phthisis. Now, from what has been said, it will not appear strange, that the brain and nerves may, by the continuance or frequent repetition of such shocks, be so weakened or disordered, that not only fatuity, a deep melancholy, or mania, but also a palsy or an apoplexy, may ensue. Further, as nervous disorders are often owing to some morbid matter in the blood, arising from a defective chylicification from weakness of the stomach and intestines, this imperfectly stimulates the brain or origin of the nerves, and it is easy to conceive, how a palsy, apoplexy, or tabes, may be the consequence.

Again, since hypochondriac and hysteric disorders, are sometimes occasioned by obstructions in the abdominal

viscera, and often give rise to them; and as from a bad digestion the chyle must be ill prepared, it will appear why those diseases do sometimes terminate in the jaundice or dropsy.

It has been observed also, that patients much afflicted with those ailments have at length fallen into a tympanites, which may be thus accounted for. I have shewn above, that the great predisposing cause of nervous, hypochondriac, and hysteric disorders, is a particular weakness and delicacy, or uncommon sensibility of the stomach and bowels; whence, from slight causes, they are often affected with spasms. Now, when the spasmodic contractions of the alimentary canal do not continue long, the wind that was pent-up is allowed to move from one place to another, and is at last expelled either upwards or downwards: but when the stomach and intestines, by reason of their weakness, and small, but continued, spasms, have been inflated by slow degrees, the irritation occasioned by this distension increases the spasm so much, that the air, continually generated by the aliment in time of digestion, is mostly retained, or, at least, is not discharged in such a quantity as to relieve the patient, or sensibly to diminish the swelling of the belly.

Lastly, a phthisis pulmonalis may also be the consequence of nervous disorders, when the morbid matter producing them falls chiefly upon the lungs; or when the vitiated chyle or blood forms obstructions in that organ.

And here it may be worth observing, that while the morbid matter producing the hypochondriac disease, chiefly affects the stomach and bowels, the patients are always apprehensive, and often greatly alarmed from any trifling increase or variation of their complaints, as if they were in immediate danger of dying; but after this matter has left its own seat, and, by fixing on the lungs, has

brought on an incurable phthisis, they generally cease to be apprehensive or fearful, and cherish the hopes of life to the last. The reason is, that when the lungs are affected, there are no such uneasy feelings excited in the body, nor fear and despondency in the mind, as when the stomach and intestines suffer, which are not only possessed of a much more delicate sensibility than the lungs, but have also a more remarkable sympathy with the brain, and whole nervous system.

SECT. LVI.

Incubus, or Night-Mare.*

In this disease, which might with much propriety be included under the article, Dyspepsia, the patient, in time of sleep, imagines he feels

1. An uncommon oppression or weight about his breast and stomach, which he can by no effort shake off;
2. He now groans, and sometimes cries out, though oftener, he attempts to speak in vain.
3. He imagines himself to be struggling with strong men, or devils, to be in a house on fire, or in danger of being drowned in the sea or some river.
4. In attempting to run away from danger, or climb up a hill, he fancies he falls back as much after every step as he had advanced before.
5. The terror excited by the frightful ideas attending the night-mare, sometimes occasions a tingling of the ears, and a tremor over the whole body.

This disorder has been commonly supposed to proceed

* From *ineumbere*, to press upon.

from a stagnation of the blood in the sinuses of the brain, or in the vessels of the lungs; or from too great a quantity of blood being sent to the head.

The horizontal posture in time of sleep, and the pressure of the stomach upon the aorta, in a supine situation, have been thought sufficient to occasion a more than usual distension of the sinuses and other vessels of the brain; and the weight of the heart pressing on the left auricle and large trunks of the pulmonary veins, may, it is said, prevent the easy return of the blood from the lungs, and so produce an oppression, and sense of weight and suffocation in the breast.* But not to enter into a particular examination of these opinions, which are far from being satisfactory, I shall only observe, that if they were true, some degree of the night-mare ought to happen to every person that lies on his back, especially after eating a full meal. Further, if a horizontal situation could overcharge the brain with blood, so as to occasion the incubus, how comes it that people, who remain for some time in an inverted posture, do not feel this disease beginning to attack them? And why does a slighter degree of the night-mare sometimes seize people who sleep in an erect situation in a chair?† As the weight of the stomach, even when filled with food, can have scarce any effect upon the motion of the blood in the aorta, so the pressure of the heart is by much too small to be able, sensibly, to retard the motion of that fluid in the pulmonary veins; otherwise people exhausted by tedious diseases, who generally lie on their back, would be constantly affected with the incubus.

* See Dr. Bond's ingenious Essay on the Incubus.

† "Something of this kind I have experienced myself, not only after eating, but also before supper, when my stomach was out of order, and troubled with wind."—Dr. WHYTT.

We know, that certain medicines or poisons, worms, and even corrupted bile, or other humours, by disagreeably affecting the nerves of the stomach, produce an oppression about the præcordia, wild imaginations, frightful dreams, raving, and insensibility: and there is no doubt, that low spirits, melancholy, and disturbed sleep, often proceed from a disordered state of the stomach. Is it not probable, that the night-mare has its seat chiefly in the same organ? If epileptic fits often proceed from the stomach, why may not the incubus, which has been considered by Galen as a nocturnal or slighter epilepsy, have its seat in that part? People troubled with nervous and hypochondriac ailments, and who have delicate or flatulent stomachs, are more subject than others to this disorder. A heavy or flatulent supper greatly increases the night-mare in those who are predisposed to it. The sympathy of the stomach with the head, heart, uterus, lungs, and diaphragm, is so remarkable, that there can be no difficulty in supposing the several symptoms of the incubus to arise from a disagreeable affection of the nerves of that organ.

When my stomach has been out of order, (says Dr. Whytt) and troubled with wind, I have often perceived the incubus seize me before I was fully asleep, the uneasiness of which would make me get up suddenly. As soon as I was quite awake, I was generally sensible I had been affected with an uneasiness about my stomach, attended with a faintness, and some sort of oppression or suffocation about my breast, as if the circulation in my lungs had been a good deal obstructed. While I sat up in bed, or lay awake, I felt nothing of these symptoms, except, perhaps, some degree of uneasiness about my stomach; but when I was just about to fall asleep, this began to return again. In this way I have often gone on, for two

hours or more, in the beginning of the night. At last, I found that a dram of brandy after the first attack, kept me easy the whole night. This remedy has never failed to succeed with me, the few times I have had occasion to try it; for of late, since my stomach has been pretty sound, I have seldom felt in my sleep any of those uneasy sensations which resemble the night-mare.

From what has been said, it seems probable, that in the incubus the stomach is commonly the part primarily affected: I say commonly, because symptoms like those of the night-mare may sometimes arise without any fault in the stomach. Thus I have known asthmatic patients, whose lungs were much obstructed, who, in time of sleep, were greatly oppressed with a sense of suffocation, and disturbed with uneasy dreams: and Dr. Lower mentions a patient, who, though he would sleep pretty easily with his head inclined forward, yet in the opposite situation, he was always soon awaked with horrid dreams and tremors; the cause of which appeared, after his death, to have been a great quantity of water in the ventricles of the brain.

The incubus is most apt to seize persons when lying on their back; because in this position, on account of the stomach and other abdominal viscera pressing more upon the diaphragm, we cannot respire with the same ease as when we sit up, or lie on one side. Further, in that situation of the body, the food seems to lie heavier on the stomach, and wind in it does not escape so readily by the æsophagus or pylorus as in an erect posture when these passages are higher than the other parts of the stomach.*

* “When I have been liable to be attacked with a sensation of faintness at my stomach, I have found it always worse when I lay on my back in the night time, and become better when I got out of bed, or sat up in it: and a middle-aged woman, who, in the morning, was frequently

We are only affected with the night-mare in time of sleep, because the strange ideas excited in the mind, in consequence of the disordered state of the stomach, are not then corrected by the external senses, as they are when we are awake; nor do we, by an increased respiration, or other motions of the body, endeavour to shake off any beginning uneasy sensation about the stomach or breast. The incubus generally seizes one in his first sleep, but seldom towards the morning, because at this time the stomach is much less loaded with food, than in the beginning of the night.

If the night-mare were owing to a stagnation of the blood in the lungs from the weight of the heart, or in the sinuses and other vessels of the brain, from the horizontal posture of the body, it would become greater the longer it continued, and would scarce ever go off spontaneously; but we know that this disease, after affecting people for some time, often gradually ceases, and is succeeded by refreshing sleep; for as soon as the load of meat, or wind, or other cause disagreeably affecting the nerves of the stomach, is removed, the oppression and weight on the breast, wild imaginations, frightful dreams, &c. vanish, as all these proceed originally from the disorder of the stomach. It is worth while, however, to observe, that as neither wind, tough phlegm, nor crudities in the stomach, do ever occasion the symptoms of the hypochondriac disease, unless the nerves of that organ be indisposed; so neither an horizontal posture, sleep, nor heavy suppers, do ever produce the night-mare, at least in any considerable degree, unless the person be predisposed to it from the particular condition of the nerves of his stomach.

subject to faintings, found that she could prevent them by getting up as soon as she perceived them about to come on."—Dr. WHYTT.

SECT. LVII.

Diabêtes; or, Immoderate Flow of Urine.

The Diabetes Méllitus*, though sometimes terminating in recovery, is yet well known to be a disease which has in general resisted every remedy hitherto recommended for its removal. Every attempt, therefore, to improve the practice in that affection, may justly be considered as deserving particular attention. The ingenious Dr. Rollo recommends a mode of treatment, which, in some instances, has been decidedly productive of remarkable benefit. It may justly, therefore, be considered as well meriting a fair trial in future cases.

The first case related, is that of Captain Meredith, of the Royal Artillery. When he came under Dr. Rollo's care, on the 16th of October, 1796, he voided about twelve quarts of urine in twenty-four hours. This urine, seven quart-bottles of which he had preserved, having been voided during the course of the night, was of a light straw colour, had no urinous smell, but emitted somewhat of a violent flavour, and was very sweet to the taste. He was affected with excessive thirst, and had drank, during the day, seven or eight quarts. His tongue was somewhat whitish, but moist; there was a cleanness in his mouth, and he spat a white frothy saliva, of a sweetish taste. His appetite for food was variable, sometimes unusually keen, particularly at uncommon times, as during the night. His face was flushed, his skin dry, but not unusually warm, and his pulse did not exceed eighty-four strokes in the minute.

* From *dià*, through, and *sauro*, to pass, and *mel*, honey.

He was frequently sick, and threw up a viscid matter, of a bitterish taste, but with some sweetness. After eating, he complained of a pain of his stomach, which in general continued about half an hour.

He complained of a constant pain in the region of the kidneys, extending forwards, but more particularly in the right, in which there seemed to be a greater fulness and tenderness to the touch.

There was likewise a retraction of the testicle, with a weakness, sense of coldness, and at night an oedematous swelling of the leg on the same side.

He also complained of a pain and tenderness of the great toe. He felt also a singular fluttering sensation in his belly, extending from the situation of the kidneys.

He was regular in his bowels, though sometimes inclined to costiveness. His stools were of a greenish colour, and had no unpleasant smell.

His gums were reddish, and had the appearance as if affected by mercury. The teeth felt to him loose. There was a fulness about the eyes, with a turbid yellowish cast, and he had slight occasional head-achs.

He had not been particularly restricted in diet, which consisted of animal food and vegetables; and he drank from a pint to a bottle of port wine daily. His other drink was toast in water.

He used exercise, both in the way of riding and walking; but he could not walk above two miles without much fatigue.

At this times thirty-six ounces, Troy weight, of his urine, analyzed by Mr. Cruickshank, yielded by evaporation three ounces and one drachm of saccharine extract, of the appearance of molasses, but thicker. According to this proportion, his whole urine for a day, would have yielded twenty-nine ounces Troy weight; an astonishing quan-

tity to be separated daily from the system. Treating some of this extract with the nitrous acid, Mr. Cruickshank procured the saccharine or oxalic acid. With a smaller proportion of the acid, it produced a substance which, in appearance, taste, and smell, could not be distinguished from honey.

Two portions of blood, about four ounces each, were taken from his arm. These, in appearance, exactly resembled what is described by Dr. Dobson, excepting that the serum did not impart a sensibly sweet taste. The crassamentum of the first cup had a slight buffy coat; the crassamentum of the second had more. The buffy coat in both was of a bluish colour, similar to what mercury sometimes produces. A portion of blood from a healthy person, drawn on the same day, was placed in the same room, and in the same circumstances with one of the portions of diabetic blood. In two days the diabetic blood assumed a caseous appearance on the surface, and the whole mass became dry and resinous, without having undergone any apparent putrefactive process. At the end of sixteen days it remained in the same state; whereas the healthy blood exhibited evident marks of great putrefaction in four days; and it became necessary to throw it away on the seventh.

When this patient came under Dr. Rollo's care, his disease had been of seven months standing. During that time he had taken some remedies, under the direction of an eminent physician at Yarmouth, the principal of which were Peruvian bark and alum. He had fallen away very considerably in flesh and fat; for, in October, 1794, when in apparent health, he weighed sixteen stones and eight pounds; and in November, 1796, he weighed only eleven stones and eight pounds, shewing a loss by the disease of no less than five stones in weight.

For six months preceding the attack of the diabetes, he was often sick, and vomited at least two or three times a week; and he frequently brought up from the stomach, during these vomittings, different things which he had eaten several days before. These seemed to be unaltered, and the taste was very generally sour.

He always ate heartily, and drank freely, but not intemperately. He was fond of high-seasoned and fat dishes. He had been subjected to two regular attacks of the gout, and had at other times two severe fits of cholic. He had been twice married, and had two children. He was, in the thirty-fourth year of his age, five feet eleven inches high, of a fair complexion, with light brown hair, and dark blue eyes.

From an attentive consideration of all the circumstances of this case, what appeared to Dr. Rollo to be the principal objects of treatment, were, to destroy the saccharine process going on in the stomach, to promote a healthy assimilation, to prevent the supposed increase of absorption from the surface, to diminish the increased action, and to change the imagined derangement of the kidneys.

With these intentions the following plan of treatment was resolved upon.

1. His diet to consist principally of animal food; for breakfast, a pint and a half of milk mixed with half a pint of lime water, or beef tea, with toasted bread; at dinner, game, and old meats, which have been long kept, and, as far as the stomach may bear, fat and rancid old meats, as pork, taking care always to eat in moderation; for supper, the same as breakfast.
2. For drink, he was allowed daily four quarts of water which had been boiled, and in which was dissolved a drachm of the kali sulphuratum. He was

strictly forbid to use any other article, excepting these, either in the way of meat or drink.

3. His skin to be anointed with hog's lard every morning. Flannel to be worn next the skin, and the gentlest exercise only to be permitted, but confinement to be preferred.
4. A draught to be taken at bed-time, consisting of twenty-five drops of tartarised antimonial wine, and twenty-five of tincture of opium, and the quantities to be gradually increased.
5. An ulceration about the size of half a crown, was directed to be produced, and maintained externally, immediately opposite to each kidney.

And lastly, his bowels were to be kept regularly open, by a pill of equal parts of aloes and soap.

This treatment was begun 19th of October, and, so soon as the 21st, some changes occurred. He made, in twenty-four hours, only six quarts of urine, and drank only three quarts of the sulphurated alkaline water. The urine was not so pale, had a cloud in it, and was more urinous in smell. On the 1st of November the urine did not exceed four quarts, while it was of a higher colour, and more urinous smell. His skin was moist, and he perspired freely; his stools were large, and very offensive, and he was in every respect much easier, though he complained of much pain from the ulcerated parts of the loins. Imagining that the quantity of alkaline salt, which he took daily in the kali sulphuratum, might have some improper effect on the kidneys, it was resolved to try hepatised ammonia, on the suggestion of Mr. Cruickshank, who was of opinion, that it might prove a more certain and active medicine in diminishing the action of the stomach, as well as the action of the system in general. He was therefore directed to take five drops of it, in each half-pint tumbler

full of water, which he used as drink. The first day he took thirty-five drops at different times, which in the evening produced sickness and vomiting, with giddiness and drowsiness. He was therefore directed to leave off the hepatised ammonia for one day, and then to begin with two drops to each tumbler full of water.

On the fourth he drank only two pints of water, and made only two quarts of urine, which was not sweet, and deposited a red sandy, or lateritious sediment. On the 5th of November, the opiate, at bed-time, was discontinued; and on the 8th the rubbing with the hog's lard was left off.

Between the 4th and 14th of November, in consequence of some irregularities on the part of the patient, particularly drinking beer and tea, the disease was, to a slight degree, reproduced. On the 14th, therefore, an entire abstinence from vegetable matter was directed; nothing was allowed approaching nearer to it than milk; and even this was directed to be left off, and strong beef-tea substituted, should the disease not disappear. This soon produced a favourable change, his urine became again of a much higher colour, and its smell and taste quite urinous.

He afterwards continued for some time with tolerable regularity on the course already mentioned, and by the 18th of December his disease seemed to be in a great measure overcome; he was therefore desired to eat half a pound of bread as a daily allowance, and to take exercise more freely.

On the 30th of December, Dr. Rollo found that since the 18th he had continued free from the disease. He was now in high spirits, and rapidly gaining flesh. His urine did not exceed two pints in the four and twenty hours. It was often under that quantity, and perfectly urinous. He now weighed thirteen stones and one pound! so that he

had gained about a stone and a half since the end of November; which furnished a convincing proof, not only of the removal of the disease, but also of the disposition to it.

After this period, Captain Meredith might be considered as continuing free from complaints. He took exercise freely, both in the way of walking and riding. He ate a sufficient proportion of bread, potatoes, and other vegetables, without any inconvenience. His appetite was good and natural, and his bowels regularly open. His urine continued perfectly natural, and, in general, did not exceed a quart in twenty-four hours. Of this urine, which was of the ordinary taste and smell, nine ounces were evaporated, and yielded of a brown and pungently saline bitterish-tasted matter, without tenacity, three drachms and twenty grains, a product excessively different from the saccharine extract resembling molasses, which his urine yielded in October. The product now obtained was very nearly the same, both in quantity and quality, as Dr. Rollo obtained from his own urine, which he had every reason to believe, was in the healthy state.

About the middle of March, Captain Meredith continuing in a state of health, was ordered on active service: to which he very readily assented, being satisfied that his health now enabled him to execute the duties of his station.

The second case which Dr. Rollo has here very minutely detailed, but into the particulars of which we cannot propose to enter, is that of a general officer in the 57th year of his age, with whom the urinary discharge amounted to ten or twelve pints in the twenty-four hours; and, while the urine had a very sweet taste, he was at the same time subjected to the other common symptoms of diabetes. After his disease had been of at least three years standing,

and after recourse had been had to the assistance of several eminent physicians, without benefit, he came under Dr. Rollo's care, in the beginning of January, 1797.

Nearly the same plan of treatment, particularly with respect to the diet of animal food, was here directed, as in the case of Captain Meredith. In a very short time, a remarkable change for the better was produced. His thirst was diminished, and his urine rarely exceeded two, three, or at the utmost four pints, in twenty-four hours, being at the same time of the natural sensible qualities. In this way he continued to the end of February, gradually recovering flesh and strength. He now resolved on returning to his residence at Portsmouth. He had very great impatience under restriction. But on parting from Dr. Rollo, he was told, that, for preventing the return of his disease, every thing depended on himself; and he acknowledged the truth of the observation.

He bore his journey very well, and arrived at Portsmouth on the 27th of February. But having eaten some vegetables on the road the day before, he was attacked with a bowel complaint. On the 6th of March he had a return of his bowel complaint, from eating beet-root. On the 9th he had the sanction of a physician to eat what he pleased, and to drink wine. The disease was soon reproduced, for his urine became sweet, and was increased in quantity, with a return of thirst and feverishness. Yet this case, Dr. Rollo justly observes, adds strength to the conclusions derived from the former case.

From the two cases Dr. Rollo draws some general inferences. He concludes,

1. That the diabetes mellitus is a disease of the stomach, proceeding from some morbid changes in the natural powers of digestion and assimilation.
2. That the kidneys and other parts of the system, as

- the head and skin, are affected secondarily, and generally by sympathy, as well as by a peculiar stimulus.
3. That the stomach affection consists in an increased action and secretion, with vitiation of the gastric fluid, and, probably, on too active a state of the lacteal absorbents.
 4. That the cure of the disease is accomplished by regimen, and medicines preventing the formation of sugar, and diminishing the increased action of the stomach.
 5. That confinement, an entire abstinence from every species of vegetable matter, a diet solely of animal food, with emetics, hepatised ammonia, and narcotics, comprehend the principal means to be employed.
 6. That the success of the treatment in a great measure establishes the five preceding inferences.
 7. That the saccharine matter of the disease is formed in the stomach, and chiefly from vegetable matter, as has been shewn by the immediate effects produced by the abstinence from vegetable matter, and the use of animal food solely.
 8. That acescency is predominant in diabetic stomachs, which continues even some time after the entire abstinence from vegetable matter, and after the formation of sugar; and that while such acescency remains, the disposition to the disease may be supposed to continue.
 9. That the saccharine matter may be removed in three days, and, by avoiding vegetable matter, will not again be reproduced; but we are not yet able to state accurately, when the disease, and the disposition to it, can be finally removed.

10. That there are two circumstances to be considered in this disease, which we may separate in the progress of the treatment. As it has been shewn, that though the formation of sugar was prevented, yet the increased action of the stomach remained, and maintained the defect of assimilation, which prevented nutrition. Hence two objects occur in the cure ; for it is not yet determined, whether the preventing the formation of sugar, by an entire abstinence from vegetable matter, and the use of animal food, with fats, if properly persevered in, might not ultimately comprehend the other, namely, the removal of the morbid action of the stomach.
11. That the lungs and skin have no connection with the production of the disease.
12. That the quantity of urine is probably in proportion to the quantity of fluids taken in, and has but little dependence on absorption of fluids, from the surface of either skin or lungs.
13. That though the disease has been shewn to consist in an increased morbid action of the stomach, and probably too great a secretion, with vitiation of the gastric fluid ; yet the peculiar or specific condition of either, as forming the disease, is acknowledged to lie in obscurity, and must remain so till the physiology of healthful digestion be properly explained and established.
14. That the first case had only been of about seven or eight months duration when the treatment commenced ; but the second case had been upwards of three years continuance. The age of the one was thirty-four ; of the other, fifty-seven ; circumstances which constituted material differences, though they seemed not to create corresponding

difficulties in the treatment, so far as the direct removal of the complaint was concerned. They may however retard, in the one instance, the entire restoration of health.

15. That, in both cases, deviations occurred in the management, and were respectively followed by reproductions of the disease, and, though disadvantageous to the patients, have confirmed our views of its nature and treatment.
16. And, lastly, that from both cases we may warrant this general conclusion, that the diabetes mellitus is so far understood as to be successfully cured*.

S E C T. LIX.

Chôlera† Morbus.

The Cholera Morbus may properly be considered under the head of those diseases which depend on the increased secretion of bile. It takes place, with different degrees of violence, in different habits; in some it is so acute as to prove fatal in a few hours, while in others it is expressed only by a slight purgative and emetic operation. In general the symptoms are as follow :

The patient is seized

1. With a violent discharge of a dark coloured fluid, in large quantity, and somewhat of a bitter taste, both from the stomach and intestines.
2. With much pain and anxiety about the *præcordia*.

* Vide Dr. Rollo's admirable work on Diabetes, in two volumes, second edition; which proves how considerable an advance may be made in an obscure disease, by the persevering industry of a philosophic practitioner.

† From *χολη*, bile, and *ερον*, a flux.

3. Together with cramps or spasms, particularly of the lower extremities.
4. There is a considerable degree of thirst.
5. The pulse is extremely quick and weak. When the disease proves fatal, the pulse intermits and becomes more feeble, the extremities become cold, the patient is seized with hiccup, and dies in the same manner as persons do from inflammation of the bowels.

This disease is most prevalent in this country, in the months of August and September, so as to be considered as an autumnal epidemic. It frequently takes place spontaneously, and independently of any sensible occasional cause being applied; at other times it is evidently connected with a sudden change of temperature in those months.

It may likewise arise from the intemperate use of food of difficult digestion, and unripe fruits. In the autumn, the hepatic system is more irritable in this country than at any other season; and the diseases, which prevail in the months of August and September, are obviously connected with the state of the biliary secretion, and approach in their nature to such as prevail in warm climates.

The fluid discharged in the *Chalera Morbus* is evidently bilious, but it is bile in a *very diseased state*, by no means corresponding with the character of the natural or healthy state of that fluid.

SECT. LX.

*Icterus** ; or, *Jaundice*.

If, after bile is secreted, its free admission into the duodenum be impeded, so that an accumulation of it takes

* From *ixtrigosa*, the name of a bird, whose plumage is yellow.

place in the extretory ducts of the liver ; it either regurgitates into the habit by the hepatic veins, or is absorbed by the lymphatic system ; in either case it produces the disease called jaundice ; the history and cure of which I shall now endeavour to explain.

This is a disease to which women are more subject than men, and adults than children ; though it takes place occasionally in persons of all ages and of both sexes. It is attended

1. With a sense of lassitude and languor.
2. A sense of pain and tension, or weight and oppression about the præcordia.
3. There is frequently much anxiety, and
4. Some degree of difficulty in breathing.
5. The eyes and roots of the nails first become yellow.
6. Afterwards the whole body, which is also sometimes attended with an itching of the skin.—The disease is often accompanied
7. With nausea.
8. Vomitting.
9. Flatulency.
10. Acidity.
11. Indigestion : and
12. The fæces, which are commonly of a white colour, have not the usual fœculent smell.
13. Solid food generally tastes bitter in the mouth in some, and
14. In the most unfavourable state of the disease there occurs hiccup, and
15. Occasional paroxysms of rigor, or chilliness.
16. The pain is sometimes extremely acute in the right hypochondrium, or in the epigastrium.
17. The state of the pulse varies ; in general it is quicker

than natural, though in some cases, especially during the passage of a gall-stone, it is slower.

18. It is said to have happened, that objects appear to the patient of a yellow colour.

This disease is frequent during pregnancy, and in early infancy; in both, however, it is of a very short duration. Its decline is marked by a gradual diminution of the sense of weight, oppression, or uneasiness about the præcordia; a return of appetite and digestion; the colour of the urine becomes more diluted; it is secreted in a larger quantity: the stools acquire a yellow colour, are more copious, and more easily procured; sometimes hard and concrete matter is found in the fæces.

It is a disease into which a patient is very liable to relapse. It is very unfavourable if the pain be violent, and attended with a quick pulse, loss both of strength and flesh, with occasional chilliness, watchfulness, and melancholy; under those circumstances, he becomes subject either to profuse sweating or hæmorrhagy. When these symptoms attend it, the disease frequently terminates in a confirmed ascites.

Under such circumstances we may conclude, that though some bile must be secreted, and that its regurgitation, or absorption, is the consequence of some resistance to its free ingress into the duodenum; yet that part of the liver is, in its structure, or organization, materially diseased, a circumstance which, though frequently attendant on jaundice, is by no means necessary to constitute the disease.

On dissection, various appearances present themselves to our notice. The brain, the bones, and even the cartilages, are found deeply tinged of a yellow colour. The *pori biliarii*, and some of the larger branches of the hepa-

tic ducts, are found sometimes obliterated by diseased structure. Gall-stones are often found in the ductus communis, but more frequently in the gall bladder and cystic duct. In some a thickening and diseased structure of the ductus communis has taken place, not unlike what has been observed in the œsophagus. In many cases there have been appearances of mechanical pressure from the distention and tumour of surrounding and neighbouring parts, as of the pancreas, duodenum, and colon, either of a temporary or permanent nature; hence a jaundice may arise from pressure during pregnancy. The bile has been found of a very viscid, and pitchy consistence, especially in the gall bladder, passing from the cystic to the common duct, and thereby perhaps resisting the passage of the more fluid hepatic bile, which would otherwise flow freely into the duodenum.

SECT. LXI.

Cólica, Colic, and Iliac Passion.*

The principal symptom of this disease is,

1. A pain felt in the lower belly.
2. It is seldom fixed and pungent in one part, but is a painful distention in some measure spreading over the whole of the belly, and particularly with a sense of twisting or wringing round the navel.
3. At the same time, with this pain, the navel and teguments of the belly are frequently drawn inwards, and often the muscles of the belly are spasmodically contracted, and this in separate portions, giving the appearance of a bag full of round balls.

Such pains, in a certain degree, sometimes occur in cases

* From *κολη*, one of the large intestines.

of diarrhœa and cholera; but these are less violent and more transitory, and are named gripings.

4. It is only when more violent and permanent, and attended with costiveness, that they constitute colic.
5. This is also commonly attended with vomiting, which in many cases is frequently repeated, especially when any thing is taken down into the stomach; and in such vomitings, not only the contents of the stomach are thrown up, but also the contents of the duodenum, and therefore frequently a quantity of bile.

In some cases of colic,

1. The peristaltic motion is inverted through the whole length of the alimentary canal, in such a manner that the contents of the great guts, and therefore stercoraceous matter, is thrown up by vomiting; and the same inversion appears still more clearly from this, that what is thrown into the rectum by glisters is again thrown out by the mouth.
2. In these circumstances of inversion the disease has been named Ileus, or the Iliac Passion; and this has been supposed to be a peculiar disease distinct from colic; but to me it appears that the two diseases are owing to the same proximate cause, and have the same symptoms only in different degree.

The colic is often without any pyrexia attending it.— Sometimes, however, an inflammation comes upon the part of the intestine especially affected; and this inflammation aggravates all the symptoms of the disease, being probably what brings on the most considerable inversion of the peristaltic motion; and, as the stercoraceous vomit-

ing is what especially distinguishes the Ileus, this has been considered as always depending on an inflammation of the intestines. However, I can affirm, that as there are inflammations of the intestines without stercoraceous vomiting, so I have seen instances of stercoraceous vomiting without inflammation; and there is therefore no ground for distinguishing ileus from colic, but as a higher degree of the same affection.

The symptoms of the colic, and the dissections of bodies dead of this disease, show very clearly, that it depends upon a spasmodic constriction of a part of the intestines; and that this therefore is to be considered as the proximate cause of the disease. In some of the dissections of persons dead of this disease, an intus-susception has been remarked to have happened; but whether this be constantly the case in all the appearances of ileus, is not certainly determined.

SECT. LXII.

Diarrhœa, or Looseness.*

This disease is characterised,

1. By an increased evacuation by stool.

This leading and characteristic symptom is so diversified in its degree, in its causes, and in the variety of matter evacuated, that it is almost impossible to give any general history of the disease.

It is to be distinguished from dysentery, by not being contagious, by being generally without fever, and by being with the evacuation of the natural excrements, which are at least for some time retained in dysentery. The two

* From *διω*, through, and *ῥεω*, to flow.

diseases have been commonly distinguished by the gripings being more violent in the dysentery ; and they are commonly less violent and less frequent in diarrhœa : but as they frequently do occur in this also, and sometimes to a considerable degree, so they do not afford any proper distinction.†

A diarrhœa is to be distinguished from cholera chiefly by the difference of their causes ; which in cholera is of one peculiar kind ; but in diarrhœa is prodigiously diversified, as we shall see presently. It has been common to distinguish cholera by the evacuation downwards being of bilious matter, and by this being always accompanied with a vomiting of the same kind ; but it does not universally apply, as a diarrhœa is sometimes attended with vomiting, and even of bilious matter.

The disease of diarrhœa, thus distinguished, is very greatly diversified ; but in all cases, the frequency of stools is to be imputed to a preternatural increase of the peristaltic motion in the whole, or at least in a considerable portion of the intestinal canal. This increased action is in different degrees, is often convulsive and spasmodic, and at any rate is a *motus abnormis* ; for which reason, (says Cullen) in the methodical Nosology, I have referred it to the order of spasmi.

Upon the same ground as I consider the disease named Lientery to be an increased peristaltic motion over the whole of the intestinal canal, arising from a peculiar irritability, I have considered it as merely a species of diarrhœa. The idea of a laxity of the intestinal canal being the cause either of lientery, or other species of diarrhœa, appears to me to be without foundation, except in the single case

† Tenesmus is a distinguishing symptom of dysentery, but it is sometimes present in diarrhœa also ; especially those diarrhœas which proceed from acrid or putrid substances in the intestines.

of frequent liquid stools from a palsy of the sphincter ani.

The increased action of the peristaltic motion, I consider as always the chief part of the proximate cause of diarrhœa: but the disease is further, and indeed chiefly, diversified by the different causes of this increased action; which we are now to inquire into.

The several causes of the increased action of the intestines may be referred, I think, in the first place, to two general heads.

The first is, of the diseases of certain parts of the body which, either from a consent of the intestines with these parts, or from the relation which the intestines have to the whole system, occasion an increased action of the intestines, without the transference of any stimulant matter from the primary diseased part to them.

The second head of the causes of the increased action of the intestines is of the stimuli of various kinds, which are applied directly to the intestines themselves.

That affections of other parts of the system may affect the intestines without transference or application of any stimulant matter, we learn from hence, that the passions of the mind do in some persons excite diarrhœa.

That diseases in other parts may in like manner affect the intestines, appears from the dentition of infants frequently exciting diarrhœa. I believe that the gout often affords another instance of the same kind; and probably there are others also, though not well ascertained.

The stimuli, which may be applied to the intestines, are of very various kinds, and are either,

1. Matters introduced by the mouth.
2. Matters poured into the intestines by the several excretories opening into them.

3. Matters poured from certain preternatural openings made into them in certain diseases.

Of those introduced by the mouth, the first to be mentioned are the aliments commonly taken in. Too great a quantity of these taken in, often prevents their due digestion in the stomach; and by being thus sent in their crude, and probably acrid, state to the intestines, they frequently excite diarrhœa.

The same aliments, though in proper quantity, yet having too great a proportion, as frequently happens, of saline or saccharine matter along with them, prove stimulant to the intestines, and excite diarrhœa.

But our aliments prove especially the causes of diarrhœa, according as they, from their own nature, or from the weakness of the stomach, are disposed to undergo an undue degree of fermentation there, and thereby become stimulant to the intestines. Thus acescent aliments are ready to produce diarrhœa; but whether from their having any directly purgative quality, or only as mixed in an over proportion with the bile, is not well determined.

Not only the acescent, but, also the putrescent disposition of the aliments, seems to occasion a diarrhœa; and it appears that even the effluvia of putrid bodies, taken in any way in large quantity, have the same effect.

Are oils or fats, taken in as part of our aliments, ever the cause of diarrhœa? and if so, in what manner do they operate?*

The other matters introduced by the mouth, which may be causes of diarrhœa, are those thrown in either as medicines, or poisons that have the faculty of stimulating the

* Rancid oils and fats certainly irritate the intestines, and may therefore produce diarrhœa from their oxygen.

alimentary canal. Thus, in the list of the *Materia Medica*, we have a long catalogue of those named purgatives; and in the list of poisons, we have many possessed of the same quality. The former given in a certain quantity, occasion a temporary diarrhœa; and given in very large doses, may occasion it in excess, and continue it longer than usual, producing that species of diarrhœa named a *Hypercatharsis*.

The matters poured into the cavity of the intestines from the excretories opening into them, and which may occasion diarrhœa, are either those from the pancreatic or biliary duct, or those from the excretories in the coats of the intestines themselves.

What changes may happen to the pancreatic juice, I do not exactly know; but I suppose that an acrid fluid may issue from the pancreas, even while still entire in its structure; but more especially when it is in a suppurated, scirrhus, or cancerous state, that a very acrid matter may be poured out by the pancreatic duct, and occasion diarrhœa.

We know well, that from the biliary duct the bile may be poured out in greater quantity than usual; and there is little doubt of its being also sometimes poured out of a more than ordinary acrid quality. It is very probable, that in both ways the bile is frequently a cause of diarrhœa.

Though I have said above that diarrhœa may be commonly distinguished from cholera, I must admit here, that as the causes producing that state of the bile which occasions cholera, may occur in all the different possible degrees of force, so as, on one occasion, to produce the most violent and distinctly marked cholera; but, upon another, to produce only the gentlest diarrhœa; which, however, will be the same disease, only varying in degree. So I think it probable, that in warm climates,

and in warm seasons, a *diarrhœa biliosa* of this kind may frequently occur, not to be always certainly distinguished from cholera.

However this may be, it is sufficiently probable, that, in some cases, the bile, without having been acted upon by the heat of the climate or season, may be redundant and acrid, and prove therefore a particular cause of diarrhœa.

Beside bile from the several causes and in the conditions mentioned, the biliary duct may pour out pus, or other matter, from abscesses in the liver, which may be the cause of diarrhœa.

Practical writers take notice of a diarrhœa wherein a thin and bloody liquid is discharged, which they suppose to have proceeded from the liver, and have therefore given the disease the name of *Hepatirrhœa**; but we have not met with any instance of this kind; and therefore cannot properly say any thing concerning it.

A second set of excretories, from which matter is poured into the cavity of the intestines, are those from the coats of the intestines themselves; and are either the exhalants proceeding directly from the extremities of the arteries, or the excretories from the mucous follicles: and both these sources occur in prodigious number over the internal surface of the whole intestinal canal. It is probable that it is chiefly the effusion from these which, in most instances, gives the matter of the liquid stools occurring in diarrhœa.

The matter from both sources may be poured out in larger quantity than usual, merely by the increased action of the intestines, whether that be excited by the passions of the mind, by diseases in other parts of the system, or by the various stimulants mentioned; or the quantity of matter poured out may be increased, not so much by the

* From *ηπαρ*, the liver, and *ρρω*, to flow.

increased action of the intestines, as by an increased afflux of fluids from other parts of the system.

Thus, cold applied to the surface of the body, and suppressed perspiration, may determine a greater quantity of fluids to the intestines.

Thus, in the *ischuria* renalis*, the urine taken into the blood-vessels is sometimes determined to pass off again by the intestines.

In like manner, pus or serum may be absorbed from the cavities in which they have been stagnant, and be again poured out into the intestines, as frequently happens, in particular with respect to the water of dropsy.

It is to be observed here, that a diarrhœa may be excited not only by a copious afflux of the system, but likewise by the mere determination of various acrid matters from the mass of blood into the cavity of the intestines. Thus it is supposed that the morbid matter of fevers is sometimes thrown out into the cavity of the intestines, and gives a critical diarrhœa, and whether I do, or do not, admit the doctrine of critical evacuations, I think it is probable that the morbid matter of the exanthemata is frequently thrown upon the intestines, and occasions diarrhœa.

It is to me further probable, that the putrescent matter diffused over the mass of blood in putrid diseases, is frequently poured out by the exhalants into the intestines, and proves there the cause, at least in part, of the diarrhœa so commonly attending these diseases.

Upon this subject of the matters poured into the cavity of the intestines, I have chiefly considered them as poured out in unusual quantity: but it is probable that, for the most part, they are also changed in their quality, and

* From *ισχω*, to restrain, and *ουρον*, the urine.

become of a more acrid and stimulant nature, upon which account especially it is that they excite, or at least increase a diarrhœa.

How far, and in what manner, the exhalant fluid may be changed in its nature and quality, we do not certainly know; but with respect to the fluid from the mucous excretories, we know that, when poured out in unusual quantity, it is commonly, at the same time, in a more liquid and acrid form; and may prove therefore, considerably irritating.

Though the copious effusion of a more liquid and acrid matter from the mucous excretories, be probably owing to the matter being poured out immediately as it is secreted from the blood into the mucous follicles, without being allowed to stagnate in the latter, so as to acquire that milder quality and thicker consistence we commonly find in the mucus in its natural state; and although we might suppose the excretions of a thin and acrid fluid should always be the effect of every determination to the mucous follicles, and of every stimulant applied to them: yet it is certain, that the reverse is sometimes the case; and that, from the mucous follicles, there is frequently an increased excretion of a mucus, which appears in its proper form of a mild, viscid, and thickish matter. This commonly occurs in the case of dysentery; and it has been observed to give a species of diarrhœa, which has been properly named the *Diarrhœa Mucosa*,

A third source of matter poured into the cavity of the intestines, and occasioning diarrhœa, is from those preternatural openings produced by diseases in the intestines or neighbouring parts. Thus the blood-vessels on the internal surface of the intestines may be opened by erosion, rupture, or anastomosis, and pour into the cavity their blood, which, either by its quantity or by its acrimony,

whether inherent or acquired by stagnation, may sometimes give a diarrhœa evacuating bloody matter. This is what I think happens in that disease which has been called the *Melæna** or *Morbus Niger*.

Another preternatural source of matter poured into the cavity of the intestines, is the rupture of abscesses seated either in the coats of the intestines themselves, or in any of the contiguous viscera, which, during an inflamed state, had formed an adhesion with some part of the intestines. The matter thus poured into their cavity may be various; purulent, or sanious, or both together, mixed at the same time with more or less of blood; and in each of these states may be a cause of diarrhœa.

Among the stimuli that may be directly applied to the intestines, and which, by increasing their peristaltic motion, may occasion diarrhœa, I must not omit to mention worms, as having frequently that effect.

I must also mention here a state of the intestines, wherein their peristaltic motion is preternaturally increased, and a diarrhœa produced; and that is, when they are affected with an erythematic inflammation. With respect to the existence of such a state, and its occasioning diarrhœa, see what is said above. Whether it is to be considered as a particular and distinct case of diarrhœa, or is always the same with some of those produced by one or other of the causes before mentioned, I have not been able to determine.

Lastly, by an accumulation of alimentary or of other matter poured into the cavity of the intestines, from several of the sources above mentioned, a diarrhœa may be especially occasioned when the absorption of the lacteals, or of other absorbents, is prevented, either by an ob-

* From *μελαις*, black.

struction of their orifices, or by an obstruction of the mesenteric glands, through which alone the absorbed fluids can be transmitted.

In one instance of this kind, when the chyle prepared in the stomach and duodenum is not absorbed in the course of the intestines, but passes off in considerable quantity by the anus, the disease has been named *Morbus Cœliacus*, or simply and more properly *Cœliaca**; which accordingly I have considered as a species of diarrhœa.

I have thus endeavoured to point out the various species of disease that may come under the general appellation of Diarrhœa; and from that enumeration it will appear, that many, and indeed the greater part of the cases of diarrhœa, are to be considered as sympathetic affections, and to be cured only by curing the primary disease upon which they depend.

SECT. LXIII.

Vermes, Worms.

It is a fact equally well known to physicians and philosophers, that the human body contains in its interior different species of worms. These worms are also known to produce diseased states of the bodies in which they inhabit, and to become the source of innumerable evils.

The usual symptoms are,

1. Disturbed sleep with startings.
2. Gnashing, or grinding of the teeth.
3. Breath exceedingly offensive in the morning.
4. Pains in the bowels, and stomach.

† Cœliac passion, from *κεκλια*, the belly.

5. Itching of the nose, and other parts.
6. Wasting of the flesh.
7. Often hectic fever, or tabes.
8. Voiding of mucous stools, and worms of different kinds.

To inquire therefore into their anatomy and economy, and to point out their peculiarities, is a matter of no small importance, but, on the contrary, may contribute to establish a more rational method of cure in diseases produced by these creatures. The descriptions of writers on this subject are frequently discordant, and we have yet to lament the want of an arrangement which shall distinctly point out the specific characters by which each worm may be distinguished. To obviate these inconveniences, and to reduce to order what has hitherto been much confused, I have, says the learned Dr. Hooper, in the following sheets, endeavoured to lay down some observations towards establishing an arrangement of human intestinal worms. It is my intention also, at some future period, to prove, that the human intestinal worms are of themselves distinct from all other worms, and only inhabit in the human *primæ viæ*.

Such is the nature and office of the human stomach and intestines, that insects, or their ovula may not unfrequently be conveyed into that canal with those things that are continually taken as food; but such insects or worms do not live long, and seldom, if ever, generate in a situation so widely different from their natural one.

Besides these, there are worms that are never found in any other situation than the human stomach or intestines, and which there generate and produce their species.

Thus it appears that the human stomach and intestines are the seat of the animalculæ, which are translated from their natural situation, and also for worms proper to them,

which live in no other situation, as I shall prove in the description of each species.

THE FIRST CLASS

Contains those worms which are generated and nourished in the human intestinal canal, and which there propagate their species.

THE SECOND CLASS

Comprehends those insects or worms, that accidentally enter the human primæ viæ *ab extra*, and which never propagate their species in that canal, but are soon eliminated from the body; such are several species of Scarabæ, the *Lumbricus Terrestris*, the *Fasciola*, the *Gordius Intestinalis*, and others.

The second class belongs to the province of natural history. The consideration of the first class is the subject of the present paper, which, from the variety it affords, I have thought proper to divide into different orders, genera, and species, and have attached such peculiarities as, eventually, will distinguish them from all others.

ORDER I. GENUS I.

SPECIES 1.

Ascaris Lumbricoïdes.

Essential Character.—The body round. Length from twelve to fifteen inches. Head furnished with three vesicles, forming in their middle a triangular space.

Situation.—They generally infest the small intestines, and of these more frequently the course of the jejunum and ileum. Sometimes they are known to ascend through the duodenum into the stomach, and I have frequently

seen them creep out at the mouth and nostrils. It happens but rarely, that they descend into the tract of the large intestines, and then only after the exhibition of vermifuges, or from other causes, which increase the peristaltic motion. They have also been detected *post mortem* in the ductus communis cholidochus; and instances are related where they have remained a considerable time in the vesica fellis*.

Number.—In general they are very numerous; I knew a girl eight years old, who voided per anum upwards of two hundred in the course of a week; between thirty and fifty is a very common number. Nevertheless instances frequently occur of their being solitary.

Colour.—When recently excluded they are transparent, and appear as if they had been sucking water tinged with blood; this colour, however, soon disappears, and they become at length of a light and opaque yellow.

Motion.—When voided by patients they are, in general, very feeble, and soon die in spite of all attempts to keep them alive. I have, however, occasionally succeeded by suddenly evacuating them by a very drastic purge, and immediately putting them into warm milk and water, when they appear extremely vivacious. Their motion is serpentine, and in no respect resembles that of the lumbricus terrestris, or earth worm, which has the power of considerably diminishing its length and again extending itself. Whereas that of the lumbricoid ascaris is never diminished, the head is always sent forward by the worm curling

* There is a preparation illustrative of this fact in the invaluable Anatomical Museum of Mr. Heaviside, a collection that confers the highest honour on the nation, as well as the individual. The greatest part of the worm is convoluted within the gall-bladder, and a portion of the tail fills the ductus cysticus.

itself into circles, and suddenly extending it with considerable force to some distance.

Refutation of this Worm being (as is by many supposed) the Earth or Lob-Worm, Lumbricus Terrestris Linnæi.

The long round worm of the human intestines has, for many centuries, been considered of the same species as the earth or lob-worm; the fallacy of which I have therefore thought proper to demonstrate.

The lumbricus terrestris has but one vesicle at its head, in the middle of which is its mouth; it is flat towards the tail, and is furnished with sharp bristles on its under surface, that serve it for feet, which the animal can erect or depress at pleasure; its annular muscles are very large and strongly marked, and its colour is of a dusky red. Whereas the lumbricoid ascaris has none of these characteristics. I have before noticed its colour is a pale yellow, that its muscles are very delicate, and its head furnished with three vesicles. Upon the under surface of the earth-worm there is a large semilunar fold in the skin, into which the animal can draw its head, or thrust it out at will; but there is no such form in the ascaris lumbricoides: the former also has an elevated belt in its middle, but in the latter there is a depressed band. On each side of the ascaris lumbricoides there is a longitudinal line very distinctly marked; on the earth-worm there are three lines upon its upper surface.

SPECIES 2.

Ascaris Vermicularis.

Essential Character.—Head obtuse, and furnished with three vesicles. Tail terminates in a sharp point.

Situation.—They are most commonly situated in the intestinum rectum of children, and are continually passing per anum; hence they are called by the Germans, after-worm. They are frequently met with in the cæcum and colon, and have been found in the stomach* and small intestines, lying hid between their tunics.

Number.—This species is generally in very considerable numbers, especially in the rectum of children. When they infest other parts, their numbers are less considerable, yet I have known upwards of an hundred vomited in the course of a day, from the stomach of a young woman.

Colour.—Their natural colour is a pale yellow. They are often observed of a yellowish green, and occasionally brown. This would appear to depend upon a variety of circumstances with which we are unacquainted: for if suffered to remain a day or two in water, they always (whatever their colour may be) become of an opaque pale yellow.

Motion.—The head is the part first put into motion, which the animal turns in every direction, sometimes forming a circle, at other times the figure eight; but most frequently its tail appears fixed, whilst it turns its body sometimes to one side, and then to the other. They are extremely vivacious, and I have seen them bury themselves in the soft fæces of children almost instantaneously upon exposure to the atmospheric air. By some they are said to jump from one place to another, but I cannot say I have ever seen them*.

* Wolf Observat. Chirurg. Medic. 1. 2. obs. 4.

† This circumstance appears to have given rise to the name ascarides; for ἀσκαρίζειν signifies the same as σκαρίζειν saltare, vel salire.

GENUS II.

SPECIES 1.

Trichuris Vulgaris.

Essential Character.—Body large and furnished with a proboscis. Tail twice as long as the body, and filiform.

Number.—I have seen upwards of twenty in some fæces of a child of six years old, and, according to the account of Blumenbach, they are, in general, in considerable number.

Situation.—Wrisberg, Blumenbach, and others, have found these worms in the intestinum rectum, in the inferior part of the ileum, and also in the jejunum, mixed with their pulpaceous contents. I have never seen them after death but in the cæcum.

Colour.—Like the vermicular ascarides.

Motion.—Its motion is by no means vivacious, which would appear to arise from a want of power, as the animal died soon after exposure to air. About a minute before its death the proboscis was withdrawn, and suddenly elongated three or four times, when it gradually curled itself into a round shape, and was never observed to move after.

ORDER II. GENUS I:

SPECIES 1.

Tænia Osculis Marginalibus.

Essential Character.—The oscula are situated upon the margin of each articulation, and the ovaria are disposed in an arborescent form.

Of the Connexion of the Joints.—The joint next to the

head is received into the basis of the head, and it, in like manner, receives the beginning of the next joint, which order is observed throughout the whole extent of the worm. Thus the inferior margin or joint, or that towards the tail, is called the receiving articulatory margin, to distinguish it from the other which is received. The receiving articulatory margin is supplied with a ligamentous band, to which the longitudinal muscles are attached, which firmly embraces the next joint. This margin may always be known from the other by its being largest, and by its being fringed, whereas the other is plain, and somewhat rounded.

Of the Separation of the Joints of this Worm into VERMES CUCURBITINI.—The joints of the *tænia osculis marginalibus* are very easily separated from each other whilst the animal is alive. This separation is effected either by the peristaltic motion of the intestines, or, perhaps, spontaneously. Each joint thus detached from the mother-worm, has the power of retaining, for a considerable time, its living principle, and is called, from its resemblance to the seed of the gourd, *vermis cucurbitinus*. This phenomenon has given rise to many warm disputes; several authors have denied their being portions of *tæniæ*, and have affirmed that they were distinct worms; but of this hereafter. The separated joints do not appear capable of retaining their situation for any length of time, but are soon forced down the intestinal tube, and at length creep out, or are expelled per anum. I knew a man who had been for some time troubled with this species of *tænia*; whenever he took a strong purgative medicine, he voided upwards of thirty or forty detached joints with his *fæces*; and I remember a female patient, who was always tormented by their creeping per anum two or three hours after dining without the exhibition of any medicine.

Such eliminations are common to all who nourish this worm.

Thus it is evident that the joints of this animal exist for a time when separated from each other. I have kept them alive, and fed them two or three days together; but I do not believe that they are capable of living any length of time in the intestines, when perfectly detached.

I am inclined to believe that the vermes cucurbitini have not the power of propagating the species, *i. e.* of forming fresh joints; I conceive that property to be peculiar to the head; but this is to be considered as mere hypothesis, cherished by the two following circumstances: First, that their expulsion always succeeds their being detached; and secondly, that the separation of the joints appear to be the only means of insuring the worm a continuance in its sphere: for, were the head to continue multiplying the joints, and the joints have the same power, they would soon obliterate the cavity of the intestinal tube, and, consequently, effect their own expulsion, or kill the patient.

Of the Formation of fresh Joints.—There are several cases faithfully recorded, and several have come under my own care, where the persons, if their veracity can be depended upon (and they had no interest in deceiving), have voided, during the time they were troubled with the worm, upwards of fifteen thousand. I have attended several patients who were martyrs to the ravages of this animal for upwards of seven years, and the number of joints, which, during that period, have been evacuated, are beyond all conception; from some upwards of fifty per day, and seldom fewer than twenty.

When a specific is administered, and the whole worm or worms brought away by stool, no more portions are ever known to follow. But experience teaches, that when all is voided except the head, then in a short time after, fresh

joints are generated, and the patient is as much troubled with them as before.

Thus it is evident, that the formation of the joints is proper to the head of the animal, and, I believe, to it alone.

Number of this Species of Tænia.—It is not, in general, solitary, as is commonly supposed; Herrenschwanz, Madame Noufier, and others, mention their seeing several come away, at the same time, from their patients.

Situation.—They are always found in the jejunum and ileum, occupying their whole extent.

Colour.—Tæniæ are mostly of a pale white, but the colour varies in different worms. They are not unfrequently of a light brown cast, which, in all probability arises from living on the chyme, or on chyle mixed with some bile.

Motion.—The motion of tæniæ is undulatory. The first joint towards the head contracts, the succeeding ones follow successively, and the worm is at length drawn considerably forwards, exactly in the manner that the earth-worm is seen to move, but not near so rapidly. By this means the food taken in at the mouth of the worm, is very soon conveyed all along the alimentary canal. I have detected milk, mixed with a colouring matter, running along this canal in the above manner, with considerable rapidity.

Length.—Boerhaave mentions his meeting with a tænia thirty ells in length, and Pliny says he has seen them upwards of thirty feet long. The exact length, however, depends upon the manner in which the death of the animal was occasioned. If expelled by irritating medicines, it will not be as long by nearly one half, as if its death had been occasioned by emollients; for, in the first instance, it

would be very much contracted, but in the latter, very much relaxed.

OBSERVATIONS.—Dionis, in his treatise upon *tænia**, has called this species *tænia articulosa demittens*, in consequence of the frequency of its parting with its joints; and this circumstance has given rise to innumerable errors.

The Arabian physicians observing these detached portions come away alive, and not thinking it possible they could be joints of another worm, believed they were a distinct species, and described them accordingly.

Others, finding several of the joints articulated together, believed it to be in consequence of suction†.

Those who could not conceive how the angles and vessels could correspond so exactly, supposed they were all surrounded by a common membrane, which Van Helmont assures us has its origin from the intestinal mucus.

Linnaeus arranges them amongst the polypi, and many very learned authorities appear to favour his opinion. The following is an extract from one of his letters to Baron de Haller. *Tæniam examinavi, et reperi 14 vivas integras, quæsi vi caput quod omnes medici in lumbrico lato quæsi-verunt, sed frustra; falsissimum est caput, quod Tulpius habet in observationibus; et frustra quæretur caput, nam caput est in singulo articulo, et os in singulo articulo, in una specie subtus, in altera ad latus. Nullus mortalium potuerit intelligere hunc vermem, qui non intellexerit polyporum naturam, et propagatur secedentibus articulis, dum*

* Dissertation sur le *Tænia* ou ver plat. p. 14.

† Vide Larthuser fundam. path. tom. ii. p. 203.

quilibet articulus vivit et accessit in perfectum corpus: inserui Upsaliensibus nunc imprimendis*.

Some believe the lateral oscula to be the mouths by which they take in their food, and, at the same time, consider them as excretory vessels. Coulet† and Ernst are of this opinion, the latter expresses himself thus: Nihil ergo restat quam statuere idem orificium absorptioni chyli et excretioni excrementorum inservire. Objectio enim, quasi nulla excrementa ejicerent isti lumbrici, quia merum chylum ederent, nulla est; aliàs infantes puro lacte viventes nihil excrementitii haberent; nec absurdum putes hoc ben. lect. si idem osculum et deglutitioni et excrementis largius. Stella enim marina unicum in superiori superficie habet orificium quo artificiose prædam arripit, devorat, et quicquid est excrementitii, per idem orificium reddit, nonne idem nostræ Tæniæ, natura diversimodo ludente, privilegium concedi potuit*?

Bonnett appears in one part of his treatise on insects, to favour a similar opinion, although he expresses himself very differently in other places. Speaking of a species of tænia he observed with two oscula on the flattened surface, he says, “ Ces petits viscères analogues à l'estomac et aux intestines communiquent avec les stigmates; et si le plus grand de ces stigmates fait les fonctions de bouche, on presume assez que l'autre s'acquitte de l'anust‡.”

The same author considers them as organs of respiration‡. The aborescent ovaria are, by those who believe

* Vide Linnæum in Collect. Epistol. ab. erud. viris ad Haller, tom. 2, p. 411.

† Tractatus Hist. de Ascarid. l. c.

* Vide Ernst. Dissert. Inaug. de Tænia secunda Plateri.

‡ Vide Bonnett Traité d'Insectologie.

‡ Vide Bonnett, l. c.

the oscula to be the true mouths which convey nourishment to the worm, taken for chylopoëtic vessels, and their ovula for small glands|| or pieces of fat, or young polypi§.

The four suckers at the head, Andry assures us, are their eyes¶ ; and Mery is willing we should consider them as the animal's nostrils*. The obtuse extremity has been taken for the head, and the true head for the tail†.

It is somewhat singular that so many accurate observers in several nations have, during many centuries, pretended that there never was but one of these tæniæ in the same individual, from whence arose the name *Solium*, and by the French, *le ver solitaire*.

It appears to me superfluous to prove the fallacy of these and various other ridiculous opinions, and to refute them; for having, I trust, satisfactorily demonstrated, that they have heads, and the head an apparatus, by means of which it absorbs the nourishment, which passes from thence to every articulation of the worm; that the oscula, and the various ramifications which are observed in the internal part of the joints, are subservient to generation, and that ovula pass from thence into the intestinal canal; and as it is sufficiently proved that these tæniæ, as well as other worms of our intestines, exist only in the human body, and that in society, I think all further refutation needless.

|| Vide *System. Natur. Linnæi*, tom. i. p. 1323.

§ Vide tom. iv. des *Memoires des Curieux de la Nature a Berlin*, p. 218.

¶ Andry sur le *Generation des ver. loc. cit.*

* The same book.

† Le Clerc *Histor. Lumbric. lator.* p. 165.

SPECIES 2.

Tænia Osculis Superficialibus.

Essential Character.—The oscula situated on the flattened surface of each joint. Ovaria disposed like a star round the osculum.

Number of this Species of Worm.—Uncertain. Seldom more than three or four; but this number is by no means unfrequent.

Length.—This species of tænia seldom exceeds five yards in length.

Situation.—It is always situated in the small intestines, and it would appear that it feeds on no other food than pure chyle.

Colour.—It is for the most part of a darker hue than the former species, nevertheless I have seen it as white as milk.

OBSERVATION.—This species of tænia is very seldom met with in this country, but is endemic in Switzerland and Russia,* and very common in Germany and other parts of Europe.

It is no uncommon circumstance in the countries where this species is endemial, to have it come away before it has arrived at its full growth, and this occurring so frequently, has given rise to the name of *Tænia Tenella*, which is by many considered as a distinct species, though, in reality, no other than the worm we have just described, differing from it in size only, having every thing else in common with it.

Linnaeus enumerates another species of tænia, which, he says, has two oscula on each joint, one placed upon each side, and which he terms *Tænia Vulgaris*. This, which at most can only be a variety, is called by Pallas,

* Vide Cartheuser libellus de morbis endemiis.

Le Gris, who says, it is of a white colour, and that easily changed into a griseous one by spirit of wine. As I have never had an opportunity of observing this worm, I pass it by—probably it is only met with in Switzerland.†

SECT. LXIV.

Colica Pictōnum;‡ or, *Devonshire Colic*.

This disorder arises from lead, somehow or other received into the body. The salt of lead has a saccharine taste, which has procured it the name also of sugar of lead. For this reason when wine begins to turn sour, the ready way to cure it of that disagreeable taste is, to substitute a sweet one which is not disagreeable to the taste, by mixing therewith ceruse, litharge, or some such preparations of lead: for the acid of the wine dissolves the lead, and therewith forms a sugar of lead, which remains mixed with the wine, and hath a taste, which, joined with that of the wine, is not unpleasant. But, as lead is one of the most dangerous poisons we know, this method ought never to be practised, except in cases of violent hæmoptosis, or spitting of blood, when it is a most efficacious medicine. Yet something very like this happens every day, and must needs have very bad consequences; while there is nobody to blame, and those to whom the thing may prove fatal can have no mistrust of it.

All the retailers of wine, in Paris, have a custom of filling their bottles on a counter covered with lead, having

† Words cannot convey any idea to the reader of the excellence of the plates of these worms, as described by Dr. Hooper, and as such we recommend them to the public. Vide Transactions of the Bolt Court Medical Society, Vol. V. page (224). Happy would it be for science, if abstruse medical enquiries were often taken up with an equal zeal and ability!

‡ From the Latin word *pictor*, a painter.

a hole in the middle, into which a leaden pipe is soldered. The wine which they spill on the counter, in filling the bottles, runs through this pipe into a leaden vessel below. In that it usually stands the whole day, or perhaps several days; after which it is taken out of the leaden vessel, and mixed with other wine, or put into the bottle of some petty customer. But, alas for the man to whose lot such liquor falls! He must feel the most fatal effects from it; and the danger to which he is exposed is so much the greater the longer the wine hath stood in the leaden vessel, and thereby acquired more of a noxious quality. We daily see cruel distempers among the common people, occasioned by such causes, which are not sufficiently attended to.

Wine that is not kept in close vessels is apt to turn sour very soon, especially in the summer; and the retailers of wine have observed that their drippings, thus collected in vessels of lead, are not liable to this inconvenience. This is what hath established among them the practice I am speaking against. As they see only the good effects thereof, and know nothing of its ill consequences, we cannot, however, be much angry with them. It is natural to think, that, as lead hath the property of keeping wine cool, it may by that means prevent its growing sour for some time; and persons who are not versed in chemistry can hardly suspect that wine is preserved from being pricked, only by being converted into a kind of poison. Yet this is the very case: for lead doth not hinder the wine from growing sour; but, uniting with its acid, as soon as it appears, and forming therewith a sugar of lead, changes the taste thereof as hath been said, and hinders the acid from affecting the palate.

It is easy to prove whether or no a suspected wine contains lead. You need only pour into it a little oil of tar-

tar per deliquium; or, if you have not that at hand, a lye of the ashes of green wood. If there be any lead dissolved in it, the liquor will immediately grow turbid, and the lead will precipitate in the form of a white powder; because the sugar of lead it contains, being a neutral salt, whose basis is a metal, is decomposed by the fixed alkali, which separates that metal from the acid. Lead thus separated from the acid of vinegar by an alkali, is called magistery of lead.

Ceruse, or white lead, is also a very dangerous poison. It is a pigment very much used, being the only white that can be applied with oil. This white is the most common, or, perhaps, the only cause of those dreadful colics with which painters, and all that work in colours, are frequently afflicted.

To the same cause, though not so apparent at first sight, we are to ascribe the Devonshire colic, where lead is received into the body dissolved in cyder, the common drink of the inhabitants of that county. This has been proved by experiment; for lead has been extracted from cyder in quantity sufficient to produce pernicious effects on the human body. The colic of Poictou, and what is called the dry belly-ache in the West Indies, are of the same nature; the following are the symptoms of all these diseases:—

1. The patient is generally first seized with an acute pain at the pit of the stomach, which extends itself down with griping pains to the bowels.
2. Soon after there is a distension, as with wind; and frequent reachings to vomit, without bringing up any thing but small quantities of bile and phlegm.
3. An obstinate costiveness follows, yet sometimes attended with a tenesmus, and the bowels seem to the patient as if they were drawn up towards the

back; at other times they are drawn into hard lumps, or hard rolls, which are plainly perceptible to the hand on the belly, by strong convulsive spasms.

4. Sometimes the coats of the intestines seem to be drawn up from the anus and down from the pylorus towards the navel.
5. When a stool is procured by artificial means, as clysters, &c. the fæces appear in little hard knots like sheep's dung, called *scybalæ*, and are in small quantity.
6. The urine is discharged in small quantity, frequently with pain and much difficulty.
7. The pulse is generally low, though sometimes a little quickened by the violence of the pain; but inflammatory symptoms seldom or never occur.
8. The extremities are often cold, and sometimes the violence of the pain causes cold clammy sweats and fainting.
9. The mind is generally much affected, and the spirits are sunk.

The disease is often tedious, especially if improperly treated, insomuch that the patients will continue in this miserable state for twenty or thirty days successively; nay, instances have been known of its continuing for six months. In this case the pains at last become almost intolerable: the patient's breath acquires a strong fetid smell like excrements, from a retention of the feces, and an absorption of the putrid effluvia from them by the lacteals. At last, when the pain in the bowels begins to abate, a pain comes on in the shoulder-joints and adjoining muscles, with an unusual sensation and tingling along the spinal marrow. This soon extends itself from thence to the nerves of the

arms and legs, which become weak; and that weakness increases till the extreme parts become paralytic, with a total loss of motion, though a benumbed sensation often remains. Sometimes, by a sudden metastasis, the brain becomes affected, a stupor and delirium come on, and the nervous system is irritated to such a degree as to produce general convulsions, which are frequently followed by death. At other times, the peristaltic motion of the intestines is inverted, and a true iliac passion is produced, which also proves fatal in a short time. Sometimes the paralytic affection of the extremities goes off, and the pain of the bowels returns with its former violence; and on the cessation of the pain in the intestines, the extremities again become paralytic, and thus the pain and palsy will alternate for a very long time.

SECT. LXV.

Spasmi.†

Spasmi † Intestinorum—Spasms of the Intestines:

Symptoms.

1. A rumbling noise in the intestines, like the washing of a barrel.
2. Frequent and changeable pain in the region of the abdomen.
3. The countenance usually very sallow, and the patient subject to the hysteric ball, and oftentimes to hysteric fits.

† From *σπᾶω*, to contract.

S E C T. LXVI.

Tympanites, or Tympany.*

The tympanites is,

1. A swelling of the abdomen; in which the teguments appear to be much stretched by some distending power within, and equally stretched in every posture of the body.
2. The swelling does not readily yield to any pressure: and in so far as it does, very quickly recovers its former state upon the pressure being removed.
3. Being struck, it gives a sound like a drum, or other stretched animal membranes.
4. No fluctuation within is to be perceived, and the whole feels less weighty than might be expected from its bulk.
5. The uneasiness of the distension is commonly relieved by the discharge of air from the alimentary canal, either upwards or downwards.

These are the characters by which the tympanites may be distinguished from the ascites; and many experiments shew, that the tympanites always depends upon a preternatural collection of air, somewhere within the teguments of the abdomen: but the seat of the air is in different cases somewhat different; and this produces the different species of the disease.

One species is, when the air collected is entirely confined within the cavity of the alimentary canal, and chiefly in that of the intestines. This species, therefore, is named the *Tympanites intestinalis*, Sauv. sp. 1. It is, of all

* From *τυμπανον*, a drum.

others, the most common, and to it especially belong the characters given above.

A second species is, when the air is collected in the sac of the peritonæum, or what is commonly called the cavity of the abdomen, that is, the space between the peritoneum and viscera, and then the disease is named Tympanites abominalis, Sauv. sp. 2. The existence of such a tympanites, without any tympanites intestinalis, has been disputed; and it certainly has been a rare occurrence: but from several dissections, it is unquestionable that such a disease has sometimes truly occurred.

The tumour of the belly sometimes grows very quickly to a considerable degree, and seldom in the slow manner the ascites commonly comes on. In some cases, however, the tympanites comes on gradually, and is introduced by an unusual flatulency of the stomach and intestines, with frequent borborygmi, and an uncommonly frequent expulsion of air upwards and downwards. This state is also frequently attended with colic pains, especially felt about the navel, and upon the sides towards the back; but generally as the disease advances, these pains become less considerable. As the disease advances, there is a pretty constant desire to discharge air, but it is accomplished with difficulty; and when obtained, although it gives some relief from the sense of distention, this relief is commonly transient and of short duration. While the disease is coming on, some inequality of tumor and tension may be perceived in different parts of the belly; but the distention soon becomes equal over the whole, and exhibits the phenomena mentioned in the character. Upon the first coming on of the disease, as well as during its progress,

6. The belly is bound, and the fæces discharged are commonly hard and dry.

7. The urine, at the beginning, is usually very little changed in quantity or quality from its natural state: but as the disease continues, it is commonly changed in both respects; and at length sometimes a strangury, and even an ischuria, comes on.
8. The disease has seldom advanced far before the appetite is much impaired, and digestion ill performed; and the whole body, except the belly, becomes considerably emaciated.
9. Together with these symptoms, a thirst and uneasy sense of heat at length comes on, and a considerable frequency of pulse occurs, which continues throughout the course of the disease.
10. When the tumor of the belly arises to a considerable bulk, the breathing becomes very difficult, with a frequent dry cough.

With all these symptoms the strength of the patient declines; and the febrile symptoms daily increasing, death at length ensues, sometimes probably in consequence of a gangrene coming upon the intestines.

SECT. LXVII.

Ascites ; or, Dropsy of the Belly.*

The name of Ascites is given to every collection of waters, causing a general swelling and distention of the lower belly; and such collections are more frequent than those which happen in the thorax.

The collections in the lower belly, like those of the thorax, are found in different situations. Most commonly they are in the sac of the peritonæum, or general cavity of the abdomen; but they often begin by sacs formed upon,

* From *ασκος*, a sack.

and connected with, one or other of the viscera: and perhaps the most frequent instances of this kind occur in the ovaria of females. Sometimes the water of ascites is found entirely without the peritonæum, and between this and the abdominal muscles.

These collections connected with particular viscera, and those formed without the peritonæum, form that disease which authors have termed the encysted dropsy, or hydrops saccatus. Their precise seat, and even their existence, is very often difficult to be ascertained. They are generally formed by collections of hydatides.

In the most ordinary case, that of abdominal dropsy,

1. The swelling at first is in some measure over the whole belly, but generally appears most considerable in the epigastrium.
2. As the disease, however, advances, the swelling becomes more uniform over the whole abdomen.
3. The distension and sense of weight, though considerable, vary a little according as the posture of the body is changed; the weight being felt the most upon the side on which the patient lies, while at the same time on the opposite side the distension becomes somewhat less.
4. In almost all the instances of ascites, the fluctuation of the water within may be perceived by the practitioner's feeling, and sometimes by his hearing.

This perception of fluctuation does not certainly distinguish the different states of dropsy; but serves very well to distinguish dropsy from tympanites, and from the state of pregnancy in women.

An ascites frequently occurs when no other species of dropsy does at the same time appear; but sometimes the ascites is a part only of universal dropsy. In this case, it usually comes on in consequence of an anasarca, gradually

increasing ; but its being joined with anasarca, does not always denote any general diathesis, as for the most part an ascites sooner or later occasions œdematous swellings of the lower extremities.

When the collection of water in the abdomen, from whatever cause, becomes considerable, it is always attended with a difficulty of breathing ; but this symptom occurs often when, at the same time, there is no water in the thorax. The ascites is sometimes unaccompanied with any fever ; but frequently there is more or less of fever present with it. The disease is never considerable, without being attended with thirst, and a scarcity of urine.

In the diagnosis of ascites, the greatest difficulty that occurs, is in discerning when the water is in the cavity of the abdomen, or when it is in the different states of encysted dropsy above mentioned. There is, perhaps, no certain means of ascertaining this in all cases ; but in many we may attempt to form some judgment with regard to it.

When the antecedent circumstances give suspicion of a general hydropic diathesis ; when at the same time some degree of dropsy appears in other parts of the body ; and, when, from its first appearance, the swelling has been equally over the whole belly, we may generally presume that the water is in the cavity of the abdomen. But when an ascites has not been preceded by any remarkable cachectic state of the system, and when, at its beginning, the tumour and tension had appeared in one part of the belly more than another, there is reason to suspect an encysted dropsy. Even when the tension and tumour of the belly have become general and uniform over the whole ; yet if the system of the body in general appear to be little affected ; if the patient's strength be little impaired ; if the appetite continue pretty entire, and the natural sleep be little inter-

rupted; if there be yet no anasarca; or, though it may have already taken place, if it be still confined to the lower extremities, and there be no leucophlegmatic paleness or sallow colour in the countenance; if there be no fever, nor so much thirst, or scarcity of urine, as occur in a more general affection; then, according as more of these different circumstances take place, there will be the stronger ground for supposing the ascites to be of the encysted kind.

The chief exception to be made from this as a general rule, will, in my opinion, be when the ascites may, with much probability, be presumed to have come on in consequence of a schirrous liver; which, I apprehend, may occasion a collection of water in the cavity of the abdomen, while the general system of the body may not be otherwise much affected.

SECT. LXVIII.

Anasarca†; or, Dropsy of the Legs.

We descend now in order to the extremities. The Anasarca is,

1. A swelling upon the surface of the body, at first, commonly appearing in particular parts only, but at length frequently appearing over the whole.
2. So far as it extends, it is an uniform swelling over the whole member, at first always soft, and readily receiving the pressure of the finger, which forms a hollow that remains for some little time after the pressure is removed, but at length rises again to its former fulness.

† From *ανα*, and *σαρξ*, the flesh.

3. This swelling generally appears, first, upon the lower extremities; and there too only in the evening, disappearing again in the morning.
4. It is usually more considerable as the person has been more in an erect posture during the day; but there are many instances of the exercise of walking preventing altogether its otherwise usual coming on.
5. Although this swelling appears at first only upon the feet and about the ankles; yet if the causes producing it continue to act, it gradually extends upwards occupying the legs, thighs, and trunk of the body, and sometimes even the head.
6. Commonly the swelling of the lower extremities diminishes during the night; and, in the morning, the swelling of the face is most considerable, which again generally disappears almost entirely in the course of the day.

An anasarca is evidently a preternatural collection of serous fluid in the cellular texture immediately under the skin. Sometimes pervading the skin itself, it oozes out through the pores of the cuticle; and sometimes, too gross to pass by these, it raises the cuticle in blisters. Sometimes the skin, not allowing the water to pervade it, is compressed and hardened, and at the same time so much distended, as to give anasarcaous tumours an unusual firmness. It is in these last circumstances also, that an erythematic inflammation is ready to come upon anasarcaous swellings.

An anasarca may immediately arise from any of the several causes of dropsy, which act more generally upon the system; and even when other species of dropsy, from particular circumstances, appear first; yet, whenever these proceed from any causes more generally affecting the sys-

tem, an anasarca sooner or later comes always to be joined with them.

The manner in which this disease commonly first appears, will be readily explained by what I have said before, respecting the effects of the posture of the body. Its gradual progress, and its affecting, after some time, not only the cellular texture under the skin, but probably also much of the same texture in the internal parts, will be understood partly from the communication that is readily made between the several parts of the cellular texture; but especially from the same general causes of the disease producing their effects in every part of the body. It appears to me, that the water of the anasarca swellings is more readily communicated to the cavity of the thorax, and to the lungs, than to the cavity of the abdomen, or to the viscera contained in it.

7. An anasarca is almost always attended with a scarcity of urine; and the urine voided, is, from its scarcity, always of a high colour; and, from the same cause, after cooling, readily lets fall a copious reddish sediment.
9. The disease is also generally attended with an unusual degree of thirst.

SECT. LXIX.

Schirrhus of the Liver.*

From what has been observed in former parts of this work, when mentioning the use of bile and its application to the purposes of the animal œconomy, it is obvious, that a considerable diminution of the quantity secreted will be

* From *σχιρρως*, a hard tumour of an indolent part, indolent, and not readily suppurating.

followed by disease. The liver may be rendered incapable of secreting the usual quantity of bile by any defect in its structure; and that this is, frequently, the impeding cause, appears from dissection.

It is an organ very susceptible of chronic inflammation, which, without alarming in the first instance, by painful or active symptoms, gradually induces obstruction; first, with an increase, and frequently afterwards a diminution of its bulk, perhaps ultimately obliterating the capillary system and *pori biliarii*, the more immediate seat of secretion. In such cases, the patient will be subject

1. To occasional pain in the right hypochondrium, extending to the scapulæ.
2. A quick pulse.
3. An increase of heat, alternating with chilly sensations.
4. Difficult breathing on quick motion.
5. Some difficulty on lying on the left side.
6. Flatulency.
7. Indigestion.
8. Acidity.
9. Costiveness, together with
10. A gradual diminution of strength and flesh; and
11. A pale or sallow complexion.

It is probable, that under these circumstances, the original mischief is in the stomach and duodenum, and that the sympathetic action on the liver is less, on which perhaps healthy secretion may depend; hence dyspeptic complaints generally precede affections of the liver, and arise from intemperance either in eating or drinking, but are more particularly induced by the abuse of spirituous liquors, even though diluted with water. The stomach, by long fasting, has its digestive powers much weakened,

by which the secretion of bile is diminished, and a diseased structure of the organ ultimately induced. Grief and anxiety of mind first weaken the powers of the stomach, and ultimately those of the liver, and thereby diminish secretion; a sedentary life will do the same.

We must not, however, confound the two. From repeated observations, says Dr. Saunders, I am induced to believe that the chronic inflammation of the liver is frequently mistaken for a dyspeptic state of the stomach. And I have seen many cases of this kind, which have been supposed to arise from indigestion. The patient generally complains of pain, which he falsely attributes to the stomach; and its continuance is so short, and the degree of it frequently so inconsiderable, that no alarm respecting the future health of the patient is produced. The relief obtained by eructation and discharge of air, tends to confirm the opinion, that the seat of the disease is in the stomach; but this relief may be explained on the principle of removing the distention of the stomach, and so taking off the pressure of this organ from that which we believe to be the seat of the disease. I believe from experience, that an attention to the following circumstances will enable us, with some certainty, to distinguish the disease.

In those cases where the liver is affected, considerable pain is felt in the parts near the scrobiculus cordis and epigastric region, upon any degree of pressure; and as the disease advances, an increase of heat, a quickness of pulse, and other symptoms of fever, are observed, especially towards night.

A Scirrhus liver usually ends in incurable jaundice, or ascites.

S E C T. LXX.

Vitiated Bile.

The inhabitants of warm climates are extremely subject to diseases arising from the increased secretion of bile, and the excess of its quantity in the primæ viæ, which, either by regurgitating into the stomach, produces a general languor of the body, together with *nausea*, foul tongue, loss of appetite, and indigestion; or, by being directed to the intestines, excites a painful diarrhœa, ultimately tending to weaken their tone, and disturb their regular peristaltic motion. It generally happens that, during the excess and prevalence of bile in the first passages, some absorption of it takes place in the habit, so that the skin becomes yellow, and the urine is sensibly impregnated with it. The pulse is quicker than natural, and there is a considerable degree of thirst, with an increase of heat, the usual symptoms of fever. The body becomes emaciated, and the general aspect of the patient is extremely unhealthy.

The natives of warm climates are less subject to inconveniences arising from the increased secretion of bile than Europeans who inhabit those countries, and whose constitution, by former habits, is ill prepared to admit such increased excitement of the liver, or such additional irritation on the primæ viæ, without much derangement of the animal œconomy. The bile in warm climates is, perhaps, more bitter and more saturated with its component parts, than in colder countries; it is therefore a more active emetic or purgative; and, although it was not secreted in a large quantity, its effects on the first passages would be more severely felt.

But the disease to which we would particularly call the attention of parents and practitioners is, green bile, or what is better known among mothers,

1. By the appearance of green stools.
2. The bile, instead of being alkaline, is then acid.
3. Instead of being bland, it is acrimonious, and is found even to excoriate the flesh.
4. Hence the pain shewn by the drawing up of the legs of children.
5. Hence their unceasing crying.

But nature kindly rids them of their evil by profuse evacuations, which this excites, and this being now the object of the fond mother's alarm, chalk glysters are thrown up, combined with opiates, or Dalby's Carminative; or some other cordial, mixed with opium, is had recourse to, and the poison is locked up and pent in a body made drunk, dead drunk, by the inconsiderateness of practitioners, attentive only to one symptom, or the damned wickedness of quack inventions, which *legally*, and will continue *legally* annually to deprive the community of thousands of innocent beings, until some *patriot* shall arise, bold enough to stem the destructive hydra-monster, which appears daily under new names, and in new shapes, regardless of shame and honour, having one only object in view,—the

Sceleratus Amor Habendi.

The sequel of this pent-up vitiated bile is, convulsions, enlargement of the mesenteric glands, tinea capitis, and the various forms of scrophula*.

* Vide the next Section.

SECT. LXXI.

Enlargement of the Mesenteric Glands, &c.

When vitiated bile is pent up in the bowels, some of it gets absorbed, and passing along, is arrested at the mesentrine glands, which swell and obstruct its farther course.

Those glands being the channel by which nutriment is conveyed into the vascular system, it is evident that when they are obstructed,

1. The habit of the body must decline.
2. The flesh, that was before firm, will soon become loose and flaccid.
3. The countenance pale.
4. And a general languor and disinclination to exercise of every kind, particularly in the morning, will prevail.
5. The appetite will vary, sometimes it will be pretty good, at other times but indifferent.
6. An unusual degree of thirst will be experienced.
7. Considerable heat will be excited upon the skin, particularly in the palms of the hands.
8. The breath will be often offensive.
9. The bowels affected with an uneasy sensation.
10. And the size of the belly increased ;
11. The pulse will be quick and small,
12. And the lassitude so much increased, that the little patient will, if permitted, continue in one position for a length of time.
13. Picking or rubbing the nose.

In this stage, the disease is often attributed to teething, if there are yet any teeth expected ; and in other instances to worms, probably from the picking or rubbing

of the nose, which has been often considered as characteristic of that complaint. But there seems little propriety in considering this act as characteristic of any particular disease, as it is common to every indisposition accompanied with fever*.

If the children attacked in this manner are of the age of 16, 18, or 20 months, I have almost always been told what fine children they were at ten or twelve months; that at that period they could walk alone; but at this time, it was added, they are totally unable, and require more nursing now than ever.

SECOND STAGE.

14. The lymphatic glands, externally, will frequently become enlarged, particularly those of the back part of the head, and under the chin.
15. The lips will be often swelled, and sometimes attended with eruptions round the mouth.
16. The same will appear on the back of the head†, and different parts of the body.
17. The eye-lashes will frequently partake of the general indisposition, and become extraordinary long.
18. At other times, the fingers, toes, back of the hand or arm, have often a morbid appearance; and, in short,
19. If accurately examined, it will be found that the lymphatic glands, in many different parts of the body, are more or less affected.

* During fever, most of the natural secretions are diminished, and that of the mucous membrane of the nose among others; from this diminution the skin becomes dry, the mucus hardens, and there arises a natural propensity to be rubbing or picking it.

† Often producing the true tinea capitis.

20. The alvine discharge is irregular, sometimes the patient shall have a purging for a day or two, but is more frequently to this period costive.
21. The loss of flesh will become daily more visible, and the bones will appear to grow larger, particularly at the joints.
22. The head also seems preternaturally enlarged*.
23. The ribs become flattened, and often curved almost to a right angle with the breast-bone or the spine, which are occasionally distorted in one or more places; and in proportion to the enlargement previous to the attack of the disease, will this symptom be more or less conspicuous.

It has been before observed, that, in this stage, the

* From the constant constriction of the cruræ of the diaphragm, the descent of the blood is impeded, more than is thrown to the head. This it enlarges, and great sagacity is the consequence, which, together with the helpless state of the infant, the more endears it to the mother. The reason why I am inclined to consider rickets and scrophula the same, are,

In the first place, scrophula is acknowledged by most persons, principally to affect the glands and bones; and the same, as far as I can determine, holds good with rickets; for in all the dissections of rickety patients, that are mentioned by authors, and particularly by Glisson, the various glands of the abdomen, and not only the lymphatic glands of the mesentery, but those about the lungs, &c. have been found much diseased. During life too, the tumid abdomen is scarcely ever absent, which is *cæteris paribus*, a striking mark of scrophulous affection.

2dly. Debility alone is insufficient for the production of rickets, as many children pass through all the stages and degrees of it, without such effects being ever observed. Some additional disposition of the body seems evidently necessary, and that appears to me to be the scrophulous, or a disposition exactly similar to that which favours scrophula.

3dly. Before the enlargement and incurvations of the bones take place in rickets, there are evident symptoms of a disordered condition of the *primæ viæ*, and of an impeded absorption of the chyle; and these can be explained, I conceive, in no way more satisfactory, than by supposing the previous existence of diseased mesenteric glands.

complaint has been usually considered as a disease of the bones; but I am inclined to think, that in almost every instance, the bones had been affected with curvature previous to the present indisposition; and that the flatness of the ribs, and prominence of the breast-bone, arose from the pressure in lifting up and down a very heavy child. It is readily admitted, however, that there may be other causes of general debility, and its consequences, some of which have been already suggested. In proportion to the narrowness of the chest, will the contents be pressed down upon the diaphragm, and, thus affecting the belly, become an additional cause of its enlargement, which is now the most distinguishing symptom, accompanied with hardness, frequent pains in the gastric region, and a purging of frothy offensive stools. The pain and enlargement of the belly, instead of being abated, are usually aggravated by this symptom, and the patient is soon carried off, as is supposed, by convulsions of the bowels. In other instances, patients become dropsical† in the last stage of this disease, and that is the supposed cause of their death; but there are many examples of children having diseased mesenteric glands, unaccompanied with any of the distinguishing external symptoms here described. These waste away daily, until nothing apparently remains but the bones covered with the skin. In proportion to the progress of the disease in the mesenteric glands, will its consequences be quicker or slower, and the patients will die of a true marasmus or general atrophy.

None of these diseases are hereditary, for you often

† In some cases, that I have had the opportunity of examining, which were dropsical, I have found the fluid thick, and apparently mixed with matter, which I have attributed to a suppuration of some mesenteric glands.

see among six children one, and one only, eat up with scrophula, whilst the rest are all healthy, and upon enquiry this child has been much troubled with green stools, or what nurses call watery gripes, which has been injudiciously managed.

SECT. LXXII.

*Hemorrhôis**, or *Piles*, and *Procedéntia ani*, or *Falling Down of the Gut*.

A discharge of blood from small tumors on the verge of the anus, is the symptom which generally constitutes the Hemorrhoids; or, as it is vulgarly called, the Hemorrhoidal flux. But a discharge of blood from within the anus, when the blood is of a florid colour, showing it to have come from no great distance, is also considered as the same disease; and physicians have agreed in making two cases or varieties of it, under the names of external and internal hemorrhoids.

In both cases it is supposed the flow of blood is from tumours previously formed, which are named hemorrhoids, or piles; and it frequently happens, that the tumours exist without any discharge of blood; in which case, however, they are supposed to be a part of the same disease, and are named *hemorrhoides cæcæ*, or *blind piles*.

These tumours, as they appear without the anus, are sometimes separate, round, and prominent, on the verge of the anus: but frequently the tumour is only one tumid ring, forming, as it were, the anus pushed without the body.

* From *αἷμα*, blood, and *ρεῖν*, to flow.

These tumors, and the discharge of blood from them, sometimes come on as an affection purely topical, and without any previous disorder in other parts of the body: but it frequently happens, even before the tumours are formed, and more especially before the blood flows, that various disorders are felt in different parts of the body, as headach, vertigo, stupor, difficulty of breathing, sickness, colic pains, pain of the back and loins; and often, together with more or fewer of these symptoms, there occurs a considerable degree of pyrexia.

The coming on of the disease with these symptoms, is usually attended with a sense of fulness, heat, itching, and pain in and about the anus.

Sometimes the disease is preceded by a discharge of serous matter from the anus: and sometimes this serous discharge, accompanied with some swelling, seems to be in place of the discharge of blood, and to relieve those disorders of the system which we have mentioned. This serous discharge, therefore, has been named the *hemorrhoids alba*.

In the hemorrhoids, the quantity of blood discharged is different upon different occasions. Sometimes the blood flows only upon the person's going to stool; and commonly in larger or lesser quantity, following the discharge of the fæces. In other cases the blood flows without any discharge of fæces; and then, generally, it is after having been preceded by the disorders above-mentioned, when it is also commonly in larger quantity. This discharge of blood is often very considerable; and by the repetition, it is often so great, as we could hardly suppose the body to bear but with the hazard of life. Indeed, though rarely, it has been so great as to prove suddenly fatal. These considerable discharges occur especially to persons who have been frequently liable to the disease. They

often induce great debility; and frequently a leucophlegmatia, or dropsy, which proves fatal.

Sometimes hemorrhoidal tumours are affected with considerable inflammation; which, ending in suppuration, gives occasion to the formation of fistulous ulcers in those parts.

SECT. LXXIII.

Choréa Sancti Viti, or St. Vitus's Dance.*

1. This disease affects both sexes, and almost only young persons.
2. It generally happens from the age of ten to that of fourteen years.
3. It comes on always before the age of puberty, and rarely continues beyond that period.
4. It is chiefly marked by convulsive motions, somewhat varied in different persons, but nearly of one kind in all; affecting the leg and arm on the same side, and generally on one side only. These convulsive motions commonly first affect the leg and foot.
5. Though the limb be at rest, the foot is often agitated by convulsive motions, turning it alternately outwards and inwards.
6. When walking is attempted, the affected leg is seldom lifted as usual in walking, but is dragged along as if the whole limb were paralytic; and, when it is attempted to be lifted, this motion is

* From χορεύω, dancing.

unsteadily performed, the limb becoming agitated by irregular convulsive motions.

7. The arm of the same side is generally affected at the same time; and, even when no voluntary motion is attempted, the arm is frequently agitated with various convulsive motions.
8. But, especially when voluntary motions are attempted, these are not properly executed, but are variously hurried or interrupted by convulsive motions in a direction contrary to that intended.
9. The most common instance of this is in the person's attempting to carry a cup of liquor to his mouth, when it is only after repeated efforts, interrupted by frequent convulsive retractions and deviations, that the cup can be carried to the mouth.
10. In this disease the mind is often affected with some degree of fatuity; and often shows the same varied, desultory, and causeless emotions, which occur in hysteria.

SECT. LXXIV.

Sea-Scurvy.

It were needless to delay the attention of the reader long on the ravages of sea-scurvy. It has been said, and I believe with truth, that during the war before last, more British seamen were destroyed by the scurvy alone, than by the wreck of storms, and the united efforts of our combined enemies.

The numbers, who died of fevers and fluxes, were

very considerable, particularly in the East and West Indies ; but neither of these diseases were so fatal as the scurvy.

During the last war, says a very ingenious and able author*, the scurvy prevailed greatly in the fleet under the command of Sir Edward Hughes in the East Indies ; and may be accounted one material cause of the want of success in that quarter of the world. I was informed by an officer, who served in that fleet, that the crews of almost all the ships were so weakened by the scurvy, that on every occasion when they came to action, they had not men sufficient to man their guns ; but particularly that in the last action, not one ship in the British line had men nearly sufficient to manage the guns properly, so many were ill of the scurvy.

The scurvy prevailed likewise considerably in the fleet under the command of Admiral Biron, when it arrived on the coast of America in 1778 ; owing to their having had a series of wet, stormy weather ; and the ships not being supplied with proper preventives.

To shew the effects of this disease on shore, I need only mention the dreadful ravages made by the scurvy among the Imperial troops in Hungary, as related by Dr. Cramer (1737, *Dissertatio Epistolica de Scorbuto*), the accounts of scurvies which afflicted the Russian armies between the year 1732 and 1744, as given by Dr. Nitzsch ; likewise the accounts given by the same author (*Treatise on the Scurvy* by Abraham Nitzsch, 1747) of the distresses occasioned by this disease in Finland, at Wiburg, at the siege of Asoph, &c. &c.—The fatality occasioned by the scurvy among the besieged at Thorn, where “ upwards of 6000 of the garrison, besides a greater number of the inhabitants, died of this distemper,” (*Observationes circa*

Scorbutum, Auctore Johanne Fred. Backstrom.) Those instances are recorded by Dr. Lind, together with several others, in his Treatise on the Scurvy. And, to come nearer to the present period, the numbers who suffered by the scurvy at Quebec, Mahon, Gibraltar, &c. are instances, (besides many others which might be mentioned) sufficient to prove the mortality among the human species, occasioned by this disease on land.

Sir Richard Hawkins, in speaking of the scurvy, says, that in the course of twenty years, he knew of 10,000 men who had died of the scurvy.—Sir Richard lived in the former part of the last century.

I shall only add, that Lord Anson says, that he lost four-fifths of his people by the sea-scurvy.—And notwithstanding the utmost attention of the commanders, officers, and surgeons, assisted by the advice and abilities of Dr. Blane, physician to the fleet, it appears by the returns made to that gentleman by the surgeons of the different ships; that, of the three diseases, which he very properly calls the Sea Epidemics, viz. fever, flux, and scurvy; the total number of sick; of those sent to the hospital; and of those who died on board of twenty-one ships of the line, and three frigates, in the course of five months; a much greater number were afflicted with the scurvy than with any other disease.

The following extract will shew the proportion of the scorbutics, to those ill of other diseases:—

Extract from Dr. Blane's fourth Table, shewing the total Number ill of each Disease; the number sent to the Hospital; and the number of those who died on board the Fleet, in the Months of February, March, April, May, and June, 1781.

Fever.			Flux.			Scurvy.		
On board.	Sent to the Hospital.	Dead.	On board.	Sent to the Hospital.	Dead.	On board.	Sent to the Hospital.	Dead.
663	73	62	1028	219	60	1844	1033	89

Hence it appears, that at the above period, the number of scorbutics were more than equal to the number ill of the other diseases united; and that, although a warm climate is by no means favourable to the production of scurvy, and that more died of that disease than either of fever or flux, yet that *even there*, it exerts its baneful influence and deleterious effects.

The characteristics are,

1. The countenance becomes pale, sallow, and bloated.
2. The patient has a sensation of languor or lassitude, with debility, and aversion to motion.
3. The gums itch, swell, become red and spongy, and frequently bleed on being in the least rubbed.
4. The breath and urine are foetid.

5. The skin is, in general, smooth and shining, but sometimes it is rough, and has the appearance of goose-skin.
6. Livid and black spots of various sizes, vibices, or ecchymoses, are observed on the legs, thighs, and sometimes on other parts.
7. There are pains in different parts, particularly in the legs: in some, the flexor tendons, and other parts about the hams, begin to contract and swell, and the legs and ancles swell considerably, particularly towards night.

In the progress of the scurvy, all the above symptoms increase ;

8. With hæmorrhages from the nose and gums.
9. Sometimes from the lungs and intestines.
10. Considerable discharge of saliva.
11. Increased debility, with a disposition to faint.
12. Putrid, foul ulcers form on different parts, particularly on the legs, which frequently bleed.
13. The legs increase in size, appear œdematous, and become stiff and hard, with a sense of weight in them.
14. Cicatrices of former wounds or sores are dissolved, and ulcers are formed on the parts, which discharge a thin, sanious, fœtid matter, or ichor; and within these ulcers there is frequently generated a fungous, fleshy, kind of substance, somewhat resembling coagulated gore, and which has been compared by the sailors to bullock's liver.

In this stage of the disease,

15. The gums are putrid and swollen, so as almost to cover the teeth.
16. The teeth become loose, and sometimes fall out: and the patient is generally incapable of taking any

kind of nourishment, but what is very soft or liquid.

17. The contraction about the knees generally increases as the disease advances; and it often happens that those, who are so unfortunate as to have this symptom, have their knees become entirely rigid.
18. Some are afflicted with dysenteries, at which time their stools are extremely offensive, and generally mixed with blood.
19. Many complain of dyspnœa, or difficulty of breathing, attended with a most distressing sensation of tightness across the chest, and troublesome oppression.

Persons deeply affected with the scurvy, whose breasts are much oppressed, and breathing difficult, with stitches in the sides, frequently become consumptive, or dropsical, or their legs swell, become œdematous or ulcerated; and during the remainder of their lives, they are subject to violent rheumatic pains, rigidity of the joints, cutaneous eruptions, &c.

Foul ulcers often remain on the legs, and are very difficult to cure; the gums frequently retain the effects of the disease during life, by being either so corroded as to leave the teeth almost bare; or being spongy and swelled so as to cover the teeth too much, and to bleed on the slightest touch.

SECT. LXXV.

Defædations of the Skin.

1. These are scabby irruptions over the body.
2. The face is pale.
3. All the vital functions are weak and languid.

S E C T. LXXVI.

Female Diseases.

In the order proposed, before Anasarca, Scurvy, and St. Vitus's Dance, we should have placed disorders of the womb, but we choose to consider feminine diseases separate from the rest, as being peculiar to one sex only.—We will first, therefore, consider

Hystéria, Hysterics.*

This disease attacks in

1. Paroxysms or fits.
2. These commonly begin by some pain and fullness felt in the left side of the belly.
3. From this a ball seems to move with a grumbling noise into the other parts of the belly; and, making as it were various convolutions there, seems to move into the stomach; and more distinctly still rises up, to the top of the gullet, where it remains for some time, and by its pressure upon the larynx, gives a sense of suffocation.
4. By the time that the disease has proceeded thus far, the patient is affected with a stupor and insensibility, while at the same time the body is agitated with various convulsions.
5. The trunk of the body is writhed to and fro, and the limbs are variously agitated; commonly the convulsive motion of one arm and hand is that of beating, with the closed fist, upon the breast very violently and repeatedly.
6. This state continues for some time, and has, during that time, some remissions and renewals of the

* From *υστερον*, the womb.

convulsive motions; but these at length cease, leaving the patient in a stupid and seemingly sleeping state.

7. More or less suddenly, and frequently with repeated sighing and sobbing, together with a murmuring noise in the belly, the patient returns to the exercise of sense and motion, but generally without any recollection of the several circumstances that had taken place during the fit.

This is the form of what is called an hysteric paroxysm, and is the most common form; but its paroxysms are considerably varied in different persons, and even in the same person at different times. It differs, by having more or fewer of the circumstances above mentioned; by these circumstances being more or less violent; and by the different duration of the whole fit.

Before the fit,

8. There is sometimes a sudden and unusually large flow of limpid urine.
9. At the coming on of the fit, the stomach is sometimes affected with vomiting, the lungs with considerable difficulty of breathing, and the heart with palpitations.
10. During the fit, the whole of the belly, and particularly the navel, is drawn strongly inwards; the sphincter ani is sometimes so firmly constricted as not to admit a small glister-pipe, and there is at the same time an entire suppression of urine.
11. Such fits are, from time to time, ready to recur; and during the intervals, the patients are liable to involuntary motions, to fits of laughing and crying, with sudden transition from the one to the other; while sometimes false imaginations, and some degree of delirium, also occur.

This disease occurs especially from the age of puberty to that of thirty-five years; and though it does sometimes, yet very seldom, appears before the former, or after the latter of these periods.

At all ages, the times at which it most readily occurs is that of the menstrual period.

In the persons liable to the fits of this disease, it is readily excited by the passions of the mind, and by every considerable emotion, especially those brought on by surprise.

The persons liable to this disease acquire often such a degree of sensibility, as to be strongly affected by every impression that comes upon them by surprise.

Having thus endeavoured to distinguish hysteria from every other disease, I shall now attempt its peculiar pathology. With respect to this, I think it will, in the first place, be obvious, that its paroxysms begin by a convulsive and spasmodic affection of the alimentary canal, which is afterwards communicated to the brain, and to a great part of the nervous system. Although the disease appears to begin in the alimentary canal, yet the connection which the paroxysms so often have with the menstrual flux, and the state of the womb, shows, that the physicians have at all times judged rightly in considering this disease as from an affection of the uterus, and ovaria.

SECT. LXXVII.

Amenorrhœa†; or, Want of the Courses.

The interruption of the menstrual flux is to be considered as of two different kinds; the one being when the menses do not begin to flow at that period of life at which they

† From α , not, and $\muηνια$, the menses.

usually appear ; and the other being that when, after they have repeatedly taken place for some time, they do, from other causes than conception, cease to return at their usual periods ; the former of these cases is named the Retention, and the latter the Suppression of the Menses.

The retention of the menses, the *emansio mensium* of Latin writers, is not to be considered as a disease merely from the menses not flowing at that period which is usual with most other women. This period is so different in different women, that no time can be precisely assigned as proper to the sex in general. In this climate the menses usually appear about the age of fourteen ; but in many they appear more early, and in many not till the sixteenth year ; in which last case it is often without any disorder being thereby occasioned. It is not therefore from the age of the person that the retention is to be considered as a disease ; and it is only to be considered as such, when, about the time the menses usually appear, some disorders arise in other parts of the body, which may be imputed to their retention ; being such as, when arising at this period, are known from experience to be removed by the flowing of the menses.

These disorders are.

1. A sluggishness, and frequent sense of lassitude and debility.
2. With various symptoms of dyspepsia, and sometimes with a preternatural appetite†.

† This is a very extraordinary symptom. It sometimes accompanies every cessation of the uterine discharge, and frequently appears in the most violent degree, in pregnancy. In young women, the appetite for chalk, lime, rubbish, charcoal, and various absorbents, is the most prevalent. Stahl, and his followers, made great use of this circumstance in supporting their favourite opinion of the *vis medicatrix naturæ*.

3. At the same time the face loses its vivid colour, becomes pale, and sometimes of a yellowish hue.
4. The whole body becomes pale and flaccid.
5. And the feet, and perhaps also a great part of the body, become affected with œdematous swellings.
6. The breathing is hurried by any quick or laborious motion of the body.
7. And the heart is liable to palpitation and syncope. A head-ache sometimes occurs.
8. But more certainly pains of the back, loins, and haunches.

These symptoms, when occurring in a high degree, constitute the chlorosis of authors, hardly ever appearing separate from the retention of the menses; and, attending to these symptoms, the cause of this retention may, I think, be perceived.

These symptoms manifestly show a considerable laxity and flaccidity of the whole system; and therefore give reason to conclude, that the retention of the menses accompanying them, is owing to a weaker action of the vessels of the uterus; which therefore do not impel the blood into their extremities with a force sufficient to open these, and pour out the blood by them.

It appears to me, therefore, that the retention of the menses is to be referred to a certain state or affection of the ovaria; but what is precisely the nature of this affection, or what are the causes of it, I will not pretend to explain; nor can I explain in what manner that primary cause of retention is to be removed. In this, therefore, as in many other cases, where we cannot assign the proximate cause of diseases, our indications of cure must be formed for obviating and removing the morbid effects or symptoms which appear.

I am next to consider Suppression. In entering upon this, I must observe, that every interruption of the flux, after it has once taken place, is not to be considered as a case of suppression. For the flux, upon its first appearance, is not always immediately established in its regular course; and therefore, if an interruption happen soon after the first appearance; or even in the course of the first, or perhaps second year after, it may often be considered as a case of retention, especially when the disease appears with the symptoms peculiar to that state.

Those which may be properly considered as cases of suppression, are such as occur after the flux has been for some time established in its regular course, and in which the interruption cannot be referred to the causes of retention, but must be imputed to some other cause. Accordingly, we often find the suppression induced by cold, fear, and other debilitating causes.

The idiopathic cases of suppression seldom continue long without being attended with various symptoms or disorders in different parts of the body; very commonly arising from the blood which should have passed by the uterus, being determined more copiously into other parts, and very often with such force as to produce hemorrhagies in these.

Hence,

1. Hemorrhagies from the nose, lungs, stomach, and other parts, have appeared in consequence of suppressed menses.
2. Besides these, there are commonly hysteric and dyspeptic symptoms produced by the same cause.
3. And frequently colic pains, with a bound belly.
4. Often, however, it becomes confirmed chlorosis, whose symptoms have been just now explained.

SECT. LXXVIII.

Menorrhagia†; or, a too great Menstrual Discharge.

The flow of the menses is considered as immoderate, when it recurs more frequently, when it continues longer, or when, during the ordinary continuance, it is more abundant than is usual with the same person at other times.

As the most part of women are liable to some inequality with respect to the period, the duration, and the quantity of their menses; so it is not every inequality in these respects that is to be considered as a disease; but only those deviations, which are excessive in degree, which are permanent, and which induce a manifest state of debility.

The circumstances are those which chiefly constitute the menorrhagia; but it is proper to observe, that although I allow the frequency, duration, and quantity of the menses to be judged of by what is usual with the same individual at other times; yet there is, in these particulars, so much uniformity observable in the whole of the sex, that in any individual in whom there occurs a considerable deviation from the common measure, such a deviation, if constantly recurring, may be considered as at least approaching to a morbid state, and as requiring most of the precautions which I shall hereafter mention as necessary to be attended to by those who are actually in such a state.

However we may determine with respect to the circumstances above-mentioned, it must still be allowed, that the immoderate flow of the menses is especially to be determined by those symptoms affecting other functions of the body, which accompany and follow the discharge.

† From *μηνίαι*, the menses, the monthly period, and *παύσις*, to burst forth.

When a larger flow than usual of the menses has been preceded by,

1. Head-ache.
2. Giddiness.
3. Or, dyspnœa, and has been ushered in,
4. By a cold stage,
5. And is attended with much pain of the back and loins,
6. With a frequent pulse, heat and thirst, it may then be considered as preternaturally large.

When, in consequence of the circumstances above noticed, and the repetition of these,

1. The face becomes pale;
2. The pulse grows weak ;
3. An unusual debility arises during exercise ;
4. The breathing is hurried by moderate exercise ; when, also,
5. The back becomes pained from any continuance in an erect posture ; when
6. The extremities become frequently cold ; and when in the evening,
7. The feet appear affected with œdematous swelling ;

We may from these symptoms certainly conclude, that the flow of the menses has been immoderate, and has already induced a dangerous state of debility.

The debility, thus induced, does often discover itself also,

8. By affections of the stomach, as anorexia, and other symptoms of dyspepsia ;
9. By a palpitation of the heart, and frequent faintings ;
10. By a weakness of mind, liable to strong emotions from slight causes, especially when suddenly presented.

SECT. LXXIX.

Fluor Albus, or the Whites.

Every serous or puriform discharge from the vagina may be, and has been, comprehended under one or other of the appellations I have prefixed to this section. Such discharges, however, may be various, and may proceed from various sources, not yet well ascertained; but I confine myself here to treat of that discharge alone which may be presumed to proceed from the same vessels, which, in their natural state, pour out the menses.

I conclude a discharge from the vagina to be of this kind,

1. From its happening to women who are subject to an immoderate flow of the menses, and liable to this from causes weakening the vessels of the uterus.
2. From its appearing chiefly, and often only a little before, as well as immediately after, the flow of the menses.
3. From the flow of the menses being diminished, in proportion as the leucorrhœa is increased.
4. From the leucorrhœa continuing after the menses have entirely ceased, and with some appearance of its observing a periodical recurrence.
5. From the leucorrhœa being accompanied with the effects of the menorrhagia.
6. From the discharge having been neither preceded by, nor accompanied with, symptoms of any topical affections of the uterus.
7. From the leucorrhœa not having appeared soon after communication with a person who might be suspected of communicating infection, and from the

first appearance of the disease not being accompanied with any inflammatory affection of the pudenda*.

The appearance of the matter discharged in the leucorrhœa is very various with respect to consistence and colour; but, from these appearances, it is not always possible to determine concerning its nature, or the particular source from whence it proceeds.

The leucorrhœa, of which I am to treat, as ascertained by the several circumstances, seems to proceed from the same causes as that species of menorrhagia which I suppose to arise from the laxity of the extreme vessels of the uterus. It accordingly often follows or accompanies such a menorrhagia.

Some authors have alledged, that a variety of circumstances in other parts of the body, may have a share in bringing on and in continuing this affection of the uterus now under consideration; but I cannot discover the reality of those causes; and it seems to me, that this leucorrhœa, excepting in so far as it depends upon a general debility of the system, is always primarily an affection of the uterus; and the affections of other parts of the body which may

* Nothing is more frequent with ignorant practitioners, than to mistake a gonorrhœa for a leucorrhœa. Women, in general, give the name of whites to a gonorrhœa, and therefore the unwary practitioner may the more easily be misled. The distinguishing characteristic of gonorrhœa is, as authors say, an inflammatory affection of the pudenda; but, as few women will suffer an inspection of the parts, we must pay some attention to the concomitant symptoms. The running in a gonorrhœa is constant, and only in small quantities; in a leucorrhœa the discharge is inconstant, and in large quantities. The other distinguishing marks of a gonorrhœa are, smarting in making water, itching of the pudenda, a swelling of the labia, and frequently of the glands about the loins. Some authors mention the colour of the discharged matter as a distinguishing mark; this, however, is inconstant.

happen to accompany it, are for the most part to be considered as effects, rather than as causes.

The effects of the leucorrhœa are much the same with those of menorrhagia; inducing a general debility, and, in particular, a debility in the functions of the stomach. If, however, the leucorrhœa be moderate, and be not accompanied with any considerable degree of menorrhagia, it may often continue long without inducing any great degree of debility; and it is only when the discharge has been very copious, as well as constant, that its effects in that way are very remarkable.

The matter discharged in the leucorrhœa is at first generally mild: but, after some continuance of the disease, it sometimes becomes acrid*; and by irritating, or, perhaps, eroding, the surfaces over which it passes, induces various painful disorders.

* The young practitioner must not conclude too hastily that an ulcer exists in the uterus when the matter discharged is acrid. Practice has afforded many instances where the matter has excoriated the pudenda, and yet no ulcer existed. A hasty opinion may give a stab to future conjugal happiness, and a word once escaped can never be recalled.

THERAPEUTICKS.

SECT. LXXX.

General Indications of Cure in Sthenic Diseases.

As the morbidic dispositions and remote causes are what we ought to have in view when we endeavour to prevent diseases, so the actual or immediate causes are the things which we must consider when we alleviate or cure them. The *Therapeia* therefore is to be chiefly directed, so as to obviate and remove the actual causes, whether the disease be universal, consisting of the general symptoms; or local, depending on the disorder of some particular part of the corporeal frame.

The general indications of cure in sthenic diseases are,

- I. THE ABSTRACTION OF STIMULI.
- II. THE AVOIDING OF STIMULI BOTH DIRECT AND INDIRECT.
- III. SEDATIVE POISONS.

THE ABSTRACTION OF STIMULI.

SECT. LXXXI.

Of Bleeding.

This has been long considered as the greatest agent in medicine: for it completely carries off a stimulus, so much the more powerful than any other, as it pervades the whole frame. And if physicians have not precisely known, whereby the living, or moving principle, was pro-

duced, yet could they not fail to observe, that the strength of the muscular fibres was in proportion to the quantity of blood in the frame. Hence, when the muscular force of the whole frame is weakened, the heart, as a particular muscle, will want somewhat of its power to propel the blood; hence the circulation becomes more languid, and the balance betwixt the irritable principle and stimuli gets restored.

Where there is an indication for bleeding, that is violent action, with a strong constitution, bleeding freely will be of singular service. As it seldom happens that bleeding once will be sufficient in a considerable inflammation, the first, or preceding blood taken, becomes a symptom of the disease.

If the coagulating lymph is superabundant,* there will be what is called a thick buff; and if its surface is considerably cupped, then future bleedings may be used with less caution, because such appearance indicates strong powers of coagulation, which always shews strength in the solids; but if the blood is weak in its powers of coagulation, lies flat in the dish, then we must be cautious in our future bleedings; or, if it was strong at first in its powers of coagulation, and after repeated bleedings becomes weak, then we must not pursue this further; but in some cases it is proper to pursue it to this point, for we shall sometimes find that the inflammatory symptoms shall not cease after repeated bleedings, if the strength continues; but the moment a degree of looseness is produced in the blood, that moment will the inflammatory action cease.

The following case is a strong instance of this:—A lady

* The superabundance seems to be for the formation of new parts; a wise intention of nature, who has often wounds of the external surface to make up and repair: but this becomes a source of evil in visceral complaints, being the material for the formation of adhesions.

had a violent cough, tightness in respiration, strong sily blood, and the symptoms continued to the sixth bleeding; when the blood was not quite so sily: but the most remarkable change was, its remaining flat on the surface. Upon this bleeding all the symptoms disappeared; and here, although the blood became weak in its power of coagulation, yet it did not produce weakness in the constitution, the vessels of the inflamed parts having still had power to contract.

On the other hand, there may be indications for bleeding sparingly: first, when there is too much action, with weakened powers: secondly, when there is a disposition to form but little blood: thirdly, when the part affected is far from the source of the circulation.

From the above three dispositions that require bleeding sparingly, or with caution, I may observe, that it will most probably be proper in all such cases to bleed from, or as near the part affected as possible, in order to have the greatest effect, with the loss of the least quantity of blood; more so than when the constitution is strong; because the constitution in such cases should feel the loss of blood as little as possible; if from the part, leeches will answer best, because commonly little irritation follows the wound of a leech: however, this can only be put in practice in inflammations not very remote from the surface. But in many cases the blood cannot be taken away from the part itself, but only from some neighbouring part, so as to affect the part inflamed: thus, we bleed in the temporal artery for inflammation of the eyes; we bleed in the jugular veins for inflammation of the brain; and also in the temporal artery, to lessen the column of blood going to the brain, by the internal carotids.

Hippocrates advises taking blood from the right arm in pleurisies, and there appears some reason in this, for

the pain is generally seated in the right side, the aorta taking a curve in that direction, and hence the blood is more determined to that side, which occasions all nations to be right-handed.

But the doctrine of revulsion taking place, the practice was to perform blood letting in pleurisies on the opposite side.

This produced the most violent contention among the faculty; and Brissot, who was the supporter of Hippocrates and Galen, discouraged, probably, by the contradictions which he must have suffered at Paris in combating the opinions that were adopted by his masters, conceived a great inclination to travel, even to the new world; he stopped in Portugal, where he did not fail to propose his doctrine.

Denis, physician to the King of Portugal, and whom we should rank in the number of those men who have made themselves known to the world only by unhappy criticisms; this man who was willing to set himself up as sovereign master of the art, maintained, against Brissot, the doctrine of the Arabians; he appealed to the academy of Salamanca, who decided in favour of Brissot.

The partisans of the latter, who died during the dispute, multiplying prodigiously, Denis raised against them every kind of battery; they were publicly taxed with ignorance and temerity; they were represented as innovators and disturbers of the public repose: the dispute was carried to the tribunal of the emperor, who did not declare himself on either side in this affair; in the meantime there appeared books in all parts of Europe in behalf of Brissot, whose sectators remained conquerors for some time.

“Who can help admiring,” says Bayle, “on one side, the obstinacy that is remarkable in mankind in favour of

popular tradition, how ill grounded soever it may be; and on the other, the readiness which the public shews in declaring for or against certain remedies; it is generally carried away by the party that cries loudest.”*

Too much action, with small powers may often, if not always, be classed with the *irritable constitution*, and bleeding should then be performed with very great caution: one case out of many I shall relate as an instance of great action with debility.

A gentleman had one of the most violent inflammations I ever saw, in one of his eyes, attended with violent pain in his head, the blood extremely sizzly, all of which denotes great action of parts; yet the buff of the blood was so loose when coagulated, that it could hardly bear its own weight, or make any resistance to the finger when pressed; and although he was bled pretty freely, yet he never found any relief from it. This blood becoming a symptom, both of the constitution and disease, manifestly shewed weak powers from its looseness, and too great action from its slowness of coagulation, which was the cause of the buff.

The following case is another strong instance of great action in a weak, irritable habit. A lady had a violent inflammation of the leg, so as to form a considerable supuration; with a pulse of one hundred and twenty, one hundred and twenty-five, and often one hundred and thirty in a minute: her blood was extremely sizzly, yet she received but little benefit from the first bleeding, although the blood coagulated pretty firmly, which indicated strength. She was of an irritable constitution, so as to receive less benefit from bleeding than another; and when bled three times, the blood became extremely loose in its texture, which bark removed, as well as the other symp-

toms. Upon leaving off the bark, the symptoms all recurred, and when she was bled again for the second attack, which was the fourth time, the blood, although inflammatory, had recovered a good deal of its proper firmness; but in the second bleeding, for this second attack, it was less so; and in the third it was still less. Suspecting that bleeding in the present case would not produce resolution, I paid particular attention to the pulse at the time of bleeding, and found that in this last bleeding the pulse increased in its frequency even in the time of bleeding; and within a few minutes after the bleeding was over, it had increased ten strokes in the minute.*—These bleedings retarded suppuration, but by producing irritability they could not effect resolution.

Where there is a disposition to form but little blood, when known, bleeding should be performed with great caution.

When the inflammation is far from the source of the circulation, the same precautions are necessary. In general it can be taken away from the part in such cases. But these are only so many facts, that require peculiar symptoms to ascertain them.

The common indications of bleeding, besides inflammation, are too often very little to be relied upon. The pulse is the great indication in inflammation; but not always to be depended upon. In inflammations that are visible, a knowledge of the kind of inflammation is in some degree ascertained, as has been observed, we therefore go upon surer ground in our indications for bleeding; but all

* This fact, of the pulse increasing upon bleeding, is not always to be set down as a sure sign of irritation being an effect; for in a sluggish pulse, arising from too much blood, the increase of stroke, and freedom given to the circulation, is salutary; but when a pulse is already quick, an increase must arise from irritation.

inflammations are not visible ; and it is, therefore, necessary to have some other criterion ; however, if we could ascertain the pulse, peculiar to such and such appearances, in invisible inflammation, and that was universally the same in all such appearances, we might then suppose that we had got a true indicative criterion for our guide, and therefore apply it to invisible inflammation, so as to judge of the inflammation by the state of the pulse ; but when we consider that the same kind of inflammation in every part of the body will not produce the same kind of pulse, but very different kinds, not according to the inflammation, but according to the nature of the parts inflamed, and those other parts also not visible, we lose at once the criterion of pulse as a guide. When we consider, also, that there shall be every other sign, or symptom, of inflammation in some viscus, and from the symptoms the viscus shall be well ascertained, yet the pulse shall be soft, and of the common frequency ; and upon bleeding, in consequence of these inflammatory symptoms, the blood shall correspond exactly with all of them, except the pulse ; it shall be sily, firm, and cup, as was the case in a lady, which has been before described, we shall be still farther convinced that the pulse is a very inadequate criterion.

If a pulse be hard, pretty full, and quick, bleeding appears to be the immediate remedy, for hardness rather shews strong contractile action of the vessels not in a state of inflammation, which also implies strong action of the blood ; and from such a pulse, a sily blood will generally be found ; but even a quick, hard pulse, and sily blood, are not always to be depended upon as sure indications of bleeding being the proper method of the resolution of inflammations ; more must be taken into the account.

The kind of blood is of great consequence to be known ; for although it should prove sily, yet if it lies squat in the

basin, and is not firm in texture, and if the symptoms, at the same time, are very violent, bleeding must be performed very sparingly, if at all; for I suspect that under such a state of blood, if the symptoms continue, bleeding, is not the proper mode of treatment. The cases of this kind, which have been related, are strong proofs of this.

As the pulse, abstracted from all other considerations, is not an absolute criterion to go by, and as sizzly blood, and a strong coagulum are after proofs, let us see if there be any collateral circumstances that can throw some light on this subject, so as to allow us to judge, *à priori*, whether it be right to bleed or not, where the pulse does not of itself indicate it. Let us remember, that in treating of inflammation of different parts, we should take notice of the pulse peculiar to each part, which I may now be allowed to repeat.

First, I observed that an inflammation in parts not vital, or such as the stomach did not sympathise with, if there were great powers, and the constitution not very irritable, the pulse was full, frequent, and hard.

Secondly, that on the contrary, in inflammations of the same parts, if the constitution was weak, irritable, &c. that then the pulse was small, frequent, and hard, although perhaps not so much so as when in vital parts.

Thirdly, that when the inflammation is in a vital part, such as the stomach, intestines, or such as the stomach readily sympathises with, then the pulse is quick, small, and hard, similar to the above.

Now, in the first stated positions we have some guide, for in the first of these, viz. where the pulse is strong, &c. there bleeding is most probably absolutely necessary, and the symptoms, with the state of blood joined, will determine better the future conduct; but in the second, where

the pulse is small, very frequent, and hard, bleeding should be performed with great caution ; yet in inflammations of the second stated parts, the constitution seems to be more irritable, giving more the signs of weakness, as if less in the power of the constitution to manage.

Bleeding, restricted to two or three ounces, can do no harm, by way of trial ; and, as in the first case, the symptoms and blood are to determine the future repetition ; but in the third, or vital parts, viz. either the stomach, or such as the stomach sympathises with, we are yet, I am afraid, left in the dark respecting the pulse. Perhaps, bleeding at first, with caution, and judging from the blood and its effects upon the other symptoms, is the only criterion we can go by.

The kind of constitution will make a material difference, whether robust or delicate.

The mode of life will also make a material difference, whether accustomed to considerable exercise, and can bear it with ease ; constitutions so habituated will bear bleeding freely, but those with contrary habits will not.

The sex will likewise make a difference, although the mode of life will increase that difference ; therefore men will bear bleeding better than women ; even age makes a material difference, the young being able to lose more blood than the old ; for the vessels of the old are not able to adapt themselves so readily to the decreased quantity ; it even should not be taken away so quickly ; and probably the constitution may, in some degree, have lost the habit of making much blood, since it has lost the necessity.

The urine will throw some light on the disease ; if high coloured, and not much in quantity, it may be presumed, with the other symptoms, that bleeding will be of singular service ; but if pale, and a good deal of it, although the

other indications are in favour of bleeding, yet it may be necessary to do it with caution.

However, bleeding should in all cases be performed with great caution, more particularly at first; and no more taken than appears to be really necessary; it should only be done to ease the constitution, or the part, and rather lower it where the constitution can bear it; but if the constitution is already below, or brought below a certain point, or gives the signs of it from the situation of the disease, then an irritable habit takes place, which is an increased disposition to act without the power to act with. This, of itself, becomes a cause of the continuance of the original disposition, and therefore will admit neither of resolution, nor suppuration, but continue in a state of inflammation; which is a much worse disease than the former:

By bleeding the attractive power of the muscular fibre for oxygen is diminished. Upon any other principle than this above-mentioned, I cannot see why bleeding should have such effects in inflammation as it sometimes has. If considered in a mechanical light, as simply lessening the quantity of blood, it cannot account for it; because the removal of any natural mechanical power, can never remove a cause which neither took its rise from, nor is supported by it; however, in this light it may be of some service; because, all the actions relative to the blood's motion will be performed with more ease to the solids, when the quantity is smaller.

It is probably from that connection between the solids and fluids, that the constitution, or a part, is in a state of perfect quietude, or health, in which we find that the fluids are, and ought to be, in a large quantity; but in a state of inflammation, or increased powers and actions, those proportions do not correspond, at least in the parts inflamed;

and by producing the equilibrium between the two, suitable to such a state, the body becomes so far as this one circumstance can affect it, in a state of health; and this in many cases will cast the balance in favour of health: it is not, however, sufficient to produce this effect in all inflammations.

The modes of direction are,

Mittatur sang. ad unc. —

Let — ounces of blood be taken, mentioning the quantity; or

Hirudines temp. vel part. dolent. applic.

Let — leaches be applied to the temples, or to the part affected, mentioning the number.

Imponant. cucurbitulæ inter scapul. et mit. sanguis ad unc. —

Let cupping glasses be applied betwixt the shoulders, and so many ounces of blood be taken, mentioning the quantity.

SECT. LXXXII.

Vomiting.

When a moderate dose of an emetic is swallowed, after the disgust proceeding from the taste is past, the stomach remains for some time undisturbed: but within twenty minutes, a half, or a whole hour, an uneasy sensation and nausea commence. These sensations come and go, the sickness on the whole increasing. There is likewise often pain felt in the head, slight rigors take place in various parts of the body, the pulse becomes weak and irregular, but generally slow; the face and lips grow pale; the eyes lose their lustre, and the countenance appears

dejected. After these symptoms have continued for some time, the nausea increases to the utmost height, and vomiting begins.

During the action of vomiting, the body is very violently agitated; the straining is attended with a great deal of pain both in the stomach and head; the face and eyes become red, all the veins appearing turgid with blood; a sweat breaks out upon the face and other parts of the body, and the pulse is quick and strong.

The vomiting usually intermits after two or three fits of retching, and all the violent symptoms go off; leaving the patient in a languid state, and oppressed with sickness. After short intervals there are usually two, three, or more attacks of retching, with the same symptoms as the first. At last the vomiting entirely ceases, though the nausea continues some time longer, the pulse being weak and slow, and the patient feeling himself almost exhausted, and drowsy.

Such are the usual symptoms which follow the operation of emetics in general; but there are others attendant on particular emetic substances. When the retching ceases, for example, after an antimonial vomit, the pulse becomes strong and frequent, the skin hot, an universal perspiration generally breaks out, and sometimes a purging occurs. When the squill emetic is taken, instead of these effects, a considerable increase of the secretion of urine usually follows: but whichever kind of emetic has been given, after all the evacuations have ceased, the patient feels considerably debilitated, and his pulse is a good deal lowered.

There is another effect from emetics, which deserves to be noticed, that the evacuation goes further; and the duodenum, with a portion of the jejunum, may be, and commonly is, evacuated at the same time. The peristaltic

motion of the alimentary canal may proceed downwards or upwards; and when any portion of its acting is, by any circumstance, directed in one way, the next adjoining portion follows the same direction. From this, in vomiting, as the peristaltic motion of the stomach is directed upwards, so the motion of the duodenum is directed in the same manner, and pours its contents into the stomach; from which it will appear, that in vomiting, a considerable portion of the upper part of the intestines may be evacuated, as we have alleged.

The most clear proof of the inverted motion of the duodenum is, that in vomiting, and especially after repeated vomiting, a quantity of bile seems to be poured from the duodenum into the stomach, and is in consequence thrown out by the mouth. This frequent appearance may depend entirely upon the quantity of bile for the time present in the duodenum, but it probably extends farther. When, in consequence of digestion, alimentary matters pass into the duodenum, as it may be supposed that Nature intends the gall-bladder and biliary ducts should then pour their fluids more copiously into the duodenum; so it may be supposed, on this occasion, that bile is poured more copiously into the duodenum, and, in consequence of the inverted motion, more copiously into the stomach, from whence it may appear more copiously in what is thrown up by vomiting. If this should not be thought sufficient to account for a quantity of bile being frequently thrown up by vomiting, there is another cause, perhaps one more powerful, to be alleged. In the action of vomiting, as the contraction of the diaphragm and of the abdominal muscles concurs at the same time, the whole viscera of the abdomen are strongly pressed: this pressure must affect the gall-bladder and biliary ducts, and occasion them to pour out their

contents very largely ; and thereby especially a large portion of bile may be thrown up by vomiting.

On this subject I must remark, that both the vulgar, and even some physicians, have been ready to suppose, that the bile thrown up by vomiting existed previously in the stomach itself, and in some instances it may have been so ; but it is more probable that it has been brought from the duodenum, and even from the gall-bladder and biliary ducts, in the manner we have explained. There is this particular reason for supposing it, that if the bile had been previously lodged in the stomach itself, it might have appeared in the first vomitings, as well as in the last : but it happens in most instances that the bile is thrown out by the mouth only after repeated vomitings, and often after repeated strainings in the organs employed in vomiting.

It was observed that emetics seldom excite any sensation in the stomach for some short period after they are swallowed. This is perhaps owing to the mucus on the internal surface of the stomach preventing the emetic from immediately coming into contact with the nerves. Nausea or sickness is a sensation peculiar to the stomach, of an uneasy nature : but so different from pain, that it seems in some degree another sense. The stomach is susceptible of pain, however, when injured or inflamed. But nausea is produced by a set of substances which have no power to injure the stomach either mechanically or chemically. It is an impression felt by the nerves of the stomach, as flavours and tastes are perceived by the nose and tongue. As the stomach is susceptible of those two sensations so different from each other, it would be curious to inquire whether both are conveyed by the same set of nerves. The stomach receives nerves both from the *par vagum* and *intercostals*. It seems not impossible that the sensation of nausea is conveyed only by the branches of

the *par vagum* which arise immediately from the brain; and that the more common sensations proceed from the *intercostals*. But, however this may be, a considerable number of substances produce nausea, and an inclination to vomit.

It is not to be expected that any explanation can be given of a sensation. There must be, however, some reason why our stomachs are made susceptible of this sensation; and all emetics must possess some common quality by which they excite it.

It can hardly be doubted but that the sensation of nausea and power of vomiting are given to the stomach for the beneficial purpose of throwing out such substances as would prove detrimental to the body if they remained in it. It is therefore extremely probable that all emetics possess some noxious quality; which idea is corroborated by this—that if any emetic substance is given in repeated doses, each so small as not to excite vomiting, they usually occasion a purging; and if the medicine gets into the blood, either by the purging not taking place of itself, or by its being prevented by the exhibition of opium, it then either acts as a sudorific or diuretic.

There seems then strong reason for thinking that emetics are of a noxious quality, since, as long as they remain in the body, they excite general uneasiness, and considerable evacuations.

Emetic substances do not produce one evacuation, but many; when they are in the stomach, they excite vomiting; when in the intestines, purging; and when in the blood vessels, sweating, or an increase of urine. In short, whenever they get into the body, every effort is made to throw them out. How these evacuations are excited, I know no other mode of explaining than by referring to the *Vis Medicatrix Naturæ*.

This will be considered by many philosophic persons as a very unsatisfactory explanation, and little better than the hypothesis of sympathy ; and there is no doubt that admitting of the *Vis Medicatrix Naturæ* as the cause of any effect, is rather cutting than untying the gordian knot. But although it is not a final explanation, yet it brings it to one common principle, with many other phænomena which take place in the human body : just as the floating of cork in water, and the sinking of lead, are said to be owing to gravitation ; although gravitation itself is an assumed quality, the cause of which is entirely unknown.

The various symptoms which take place in vomiting are then explained in the following manner.

Emetics are conceived to be substances noxious to the human body. The nausea is a sensation of an extremely disagreeable kind, produced by the application of those substances to the nerves ; and, like all other blunt uneasy sensations, occasions a weakness in the pulse, paleness, and debility. The violent exertion of the stomach and muscles, which afterwards occurs, is an effect of the *Vis Medicatrix Naturæ* to expel the noxious matter ; and this effort, like all other bodily exertions, is accompanied with a hurried circulation.

The purging, sweating, and increase of urine, are supposed likewise to be efforts to expel the noxious substance from the intestines or blood-vessels.

After the whole tumult is over, a considerable degree of debility and langour takes place : partly proceeding from the evacuation, and partly from that depression which always follows great exertions.

There are some circumstances, which ought to be particularly attended to, before we venture to give a full emetic. In the first place, they should never be given where there is very great fullness of the vessels, and where

the florid complexion, and brightness or protuberancy of the eyes, together with pain, heaviness and giddiness of the head, shew that the vessels of the brain may be overloaded or ruptured in the straining to puke; in all such cases, bleeding, and that in pretty large quantities, should always be premised. Emetics also should be cautiously administered in cases where we know that there has been, or have sufficient reason to apprehend that there may be, a rupture of any considerable vessel in the lungs: neither are they to be given if the stomach be inflamed.

The best means of applying an emetic is to give it in nauseating doses, whereby more is produced than the mere abstraction of the natural stimuli; for medicines, which have the power of producing sickness, lessen the action, and even the general powers of life, for a time, in consequence of every part of the body sympathizing with the stomach, and their effects are pretty quick. Sickness lowers the pulse; makes the smaller vessels contract, and rather disposes the skin for perspiration, but not of the active or warm kind; but I believe it should proceed no farther than sickness; for the act of vomiting is rather a counteraction to that effect, and produces its action from another cause. It is similar to the hot fit of an ague; a counteraction to the cold one. There are few so weak, but they will bear vomiting, but cannot bear sickness long.

The medicines chiefly employed in this country are the ipecacuanha, and tartar emetic*.

The first is a West-Indian root, of which there are two principal kinds, distinguished by their colour, and brought from different places; but both possessing the same

* These appear to act upon different principles, for acids assist tartar emetic, whereas even a scruple of ipecacuan will have no emetic effect if given in half a glass of lemon juice.

virtues, though in a different degree. The one is ash-coloured or grey, and brought from Peru; the other is brown, and is brought from the Brazils: and these are indifferently sent into Europe under the general name of ipecacuanha.

These two sorts have been by some supposed to be the roots of two different plants: but, according to others, this is a mistake; the only difference being that one grows in a different place, and in a richer and moister soil, and is better supplied with juices than the other. The plant they belong to is a species of *Psychotria*.

The ash-coloured ipecacuan is a small wrinkled root, bent and contorted into a great variety of figures, brought over in short pieces full of wrinkles, and deep circular fissures, quite down to a small white woody fibre that runs in the middle of each piece: the cortical part is compact, brittle, looks smooth, and resinous upon breaking: it has very little smell; the taste is bitterish and subacid, covering the tongue as it were with a kind of mucilage. The brown sort is small, and somewhat more wrinkled than the foregoing; of a brown or blackish colour without, and white within. The first sort, the ash-coloured or grey ipecacuan, is that usually preferred for medicinal use. The brown has been sometimes observed, even in a small dose, to produce violent effects. A third sort, called the white from its colour, has also been distinguished. It is woody, has no wrinkles, and no perceptible bitterness in taste. This, though taken in a large dose, has scarce any effect at all. It is supposed to belong to a species of *Viola*. Mr. Geoffroy calls this sort bastard ipecacuan, and complains that it is an imposition upon the public. Geoffroy, Neumann, Dale, and Sir Hans Sloane, inform us, that the roots of a kind of apocynum (dogs-bane) are too frequently brought over instead of it; and instances

are given of ill consequences following from the use of it; But if the marks above laid down, particularly the ash-colour, brittleness, deep wrinkles, and bitterish taste, be carefully attended to, all mistakes of this kind may be prevented.

Ipecacuan was first brought into Europe about the middle of the last century, and an account of it published about the same time by Piso; but it did not come into general use till about the year 1686, when Helvetius, under the patronage of Lewis XIV. introduced it into practice.

This medicine is employed either in the wine or in the powder; and the latter, as operating in a smaller dose, gives a more manageable emetic: for the powder is pretty certainly thrown out in the first vomitings, and therefore ceases to operate, whilst the wine often adheres longer to the stomach.

The medicine in either form proves very certainly emetic; and the powder, to the quantity of a grain, or perhaps less in many persons, can hardly be given without exciting nausea and perhaps vomiting. Such small doses do not indeed always produce these effects; but as they frequently do, we mention them to show that small quantities often operate upon the stomach; and the instances of it make me ready to listen to the accounts which have been reported of very small doses of this medicine.

Among these reports, however, I have difficulty in giving faith to those of Dr. Pye, reported in the London Medical Observations, Vol. I. art. 22, whilst he gives no account of the nature of the ipecacuanha that he employed, as different from, or of superior power to, that in common use with us. In this, though I have often observed in certain persons the effects of small doses above mentioned, yet they are not to be observed in every

person; and I can assert, that in nine persons out of ten they will hardly appear from doses under five grains. For exciting vomiting, and especially to excite repeated vomitings, we hardly depend on any dose under ten grains, and frequently a larger dose is required. It appears to me that the small doses would hardly answer our purpose without the assistance of warm water. Larger doses indeed may be given with safety, because, as we have said, they are commonly thrown out in the first vomitings: but even on this account, they do not answer the purpose that may be required of repeated vomiting; and our practitioners commonly find, that to give any powerful or permanent stimulous to the stomach, it is necessary to add to the ipecacuanha some portion of emetic tartar.

R Ipecac. pulv.—scr. 1.

Antim. tart.—gr. 2.

F. pulv. emetic.

That is, take of

The powder of ipecacuanha—one scruple.

Tartarized antimony—two grains.

To make an emetic power.

Perhaps the best mode of giving this powder is as follows :

R Ipecac.—scr. 1.

Antim. tart.—gr. 2.

Aq. font.—unc. 2.

F. mist. emetic.

Cap. tertiam partem, et post quadrantem part. horæ, repet. coch. min. 1. omni decem minutâ usque ad vomitionem.

That is, take of

Ipecacuanha—one scruple.

Tartarized antimony—two grains.

Common water—two ounces.

To make an emetic mixture.

Take of this a third part, and after a 'quarter of an hour repeat a tea-spoonful every ~~five~~ minutes until it vomits.

The other is simple emetic tartar. Of these two substances; the ipecacuanha is by far the mildest in its operation; which is not solely owing to a difference in the dose, because when a dose of tartar emetic is given, barely sufficient to occasion vomiting, it almost always operates with violence; whereas, when the dose of the ipecacuanha is twice or three times larger than is necessary, it still operates mildly.

The tartar emetic not only excites a much more violent action on the stomach, but it likewise generally operates either as a purgative or a sudorific, or both; these latter effects are, without doubt, owing to some portion of the medicine not being thrown up during the vomiting.

On the other hand, a dose of ipecacuanha seldom produces any other effect than vomiting, which probably proceeds from its being usually all thrown up. It must naturally happen, that part of a dissolved salt will be more apt to escape the action of the stomach, than a part of an undissolved powder. For the solution of tartar emetic will diffuse itself through the fluids of the stomach so minutely, that if one drop of fluid remains in the stomach, that drop will have some of the tartar emetic in union with it. Repeated draughts of warm water being swallowed and thrown up, must always lessen the quantity of tartar emetic; but it will hardly be possible to discharge the whole. Powder ipecacuanha will be easier expelled by the action of the stomach, because it does not diffuse itself so minutely as a dissolved salt.

This idea is confirmed by a fact mentioned by Dr. Cullen, who is a very accurate observer of the powers of

medicines; namely, that the * powder of ipecacuanha is a more manageable emetic than the tincture†, because “the tincture often *adheres* longer to the stomach.”

By the expression *adheres*, Dr. Cullen could only mean, that it remains longer in the stomach, and occasions sickness for a longer time than the powder; because it is impossible for a subtle fluid like white wine literally to adhere. But, as in the tincture, the resin of the ipecacuanha is in a state of solution, it will be difficult to expel the whole; for the same reason that it is difficult to expel the solution of tartar emetic. But, although the tincture of ipecacuanha produces a severe and lasting sickness, it seldom occasions much purging or sweating, like the tartar emetic. This is probably owing to its being a much weaker medicine. If a half or a quarter of a grain of emetic tartar gets into the intestines, it will often excite a considerable evacuation; whereas it requires several grains of ipecacuanha to produce an equal effect.

Almost all writers on the *Materia Medica* have observed, that powder ipecacuanha acts with nearly equal powers, whether a small or large dose is swallowed: which is in all probability owing to this; that as soon as ever a small portion of the powder is dissolved, it occasions nausea and vomiting, and all of it is quickly expelled from the stomach. So that the quantity given is not very material, provided enough is swallowed to excite vomiting. No man, however, ought to venture to give an excessive dose, depending upon this general fact; lest the powder should not all be expelled, and serious effects be produced.

* Cullen's Treat. Mat. Med. vol. ii. p. 475.

† The tincture of ipecacuanha, or what is more commonly called ipecacuanha wine, is taken thus: a tea-spoonful every ten minutes, until it vomits.

The antimonial powder* of the London Dispensary is also employed as an emetic.

In this preparation, the antimony is not in a saline state, like the tartar emetic, but in that of a calx. Before this medicine can produce any effect upon the stomach, it must be dissolved by its juices.

It is probably this circumstance alone which is the cause of the difference between the action of the pulvis antimonialis and the tartar emetic in the human body.

Antimony is the basis of both these medicines; but the tartar emetic, when exhibited, is in a saline and dissolved state, and capable of acting upon the nerves of the stomach as soon as it comes in contact with them; whereas the antimonial power is in a calcined undissolved state, and cannot excite any action till it is dissolved.

The tartar emetic is consequently much more apt to excite vomiting; and the antimonial powder is more apt to produce purging and sweating.

It has often been tried to produce these effects, by exhibiting very small doses of tartar emetic, and repeating them frequently. But it is now pretty generally admitted, that by no management of tartar emetic, can it be made to excite sweating and purging without vomiting, with such success as the antimonial powder. The slow and gradual solution of this calx lets loose the antimony upon the stomach in a small quantity at a time. A slight nausea

* R Antim. pulv.—gr. 3.

Glycyrr. pulv.—gr. 7.

Mucil. G. arab.—gr. 1.

F. bolus statim sumendus.

That is, take of

Antimonial powder—three grains.

Liquorice powder—seven grains.

Mucilage of gum arabic—as much as is sufficient.

Make a bolus to be taken immediately.

is only felt, which is not sufficient to occasion vomiting. The antimony then passes into the intestines, and part of it is absorbed, and purging and sweating are produced.

The antimonial wine is a medicine also much in use. Its powers appear to be exactly the same with a solution of tartar emetic. It is not very easy to ascertain the exact comparative strength of these medicines; but, as far as I can judge, a grain of emetic tartar* is nearly equal to a dram of antimonial wine.

Ipecacuanha and antimony are considered as so decidedly the best and most manageable emetics, that it is hardly necessary to treat of the others.

The only remaining emetic perhaps that may require any attention is that of squills, and this has been frequently ordered by Dr. Thornton with much advantage, especially in inflammation of the lungs. The formula is,

Tinct. scillæ—unc. 3.

Cap. coch. min. 1. omni quinque minutâ usque ad vomitionem.

That is,

Tincture of squills.

Take a tea-spoonful of this every five minutes until vomiting comes on.

* The emetic tartar is prescribed from 2 to 5 grains. The following is a very good formula:—

R Antim. tart.—gr. 4.

Aq. menth. sativ.—unct. 6.

Syr. croci—dr. 2.

M. sum. coch. larg. 2 omni quadr. hor. donec vomitus moveatur, vel ad nauseam creandam.

That is, take of

Tartarised antimony—four grains.

Simple peppermint water—six ounces.

Syrup of saffron—two drachms.

For a mixture.—Take of this two table-spoonful every quarter of an hour until vomiting is produced, or a violent nausea.

I need mention but one more, which is an infusion from half a drachm to a drachm of the dried leaves of tobacco, or of these as they are commonly prepared for chewing, for an hour, or more, in four ounces of boiling water, affords an emetic which produces great nausea and depression, but as the sickness is less manageable in both these last, than with the ipecacuan and emetic tartar, and appear, what practitioners would term, extremely inelegant, their specific powers have not been as yet sufficiently ascertained.

It may be proper here just to mention, that to bring up opium the best emetic is zinc,* and where arsenic, or corrosives, are taken, we should employ ipecacuan, or use oil, or butter; but here, perhaps, the best vomit as quickest, is to put the finger or feather down the throat.

SECT. LXXXIII.

Purging.

Purging abates an intenseness of motion in the vascular system, on two accounts; first, as it draws off a considerable quantity of animal fluid, of course lessening the force of the motory fibres in general, and those of the heart and arterial tunics in particular; and, secondly, as it clears the intestines of many acrid and stimulating matters, which by their stay would necessarily keep up an unusual degree of irritation.

Hence it is of great service in all cases where the mo-

* The formula is,

Zinc sulphat.—scr. 1.

Aq. tepid unc. 4, solve ut ft. haus. emetic.

That is,

A scruple of vitriolated zinc dissolved in four ounces of water for an emetic.

tions of the vascular system are raised much above the healthy rate, to subjoin the use of cathartics to the letting of blood, or even frequently to give them previous to venesection.

The substances used for emptying downwards through the alimentary canal are distinguished into such as are lenient; opening the belly but gently; and such as are drastic, and purge briskly. Their action consists in irritating the sensible fibres of the intestines, whereby not only the peristaltic motion is accelerated, but also the secretion of mucus and lymphatic vapour, which ouze every where into the cavities of the intestines, is increased, as well as unusual quantities of pancreatic juice and bile derived from their several sources. Hence we may easily judge how great a quantity of humours may be carried off by one brisk purge, and in how sensible a degree the whole mass of fluids may be thereby decreased.

Consequently it is obvious, that the evacuation by stool may be so large as to diminish the quantity of fluids in the whole system; and therefore, that whenever such a diminution is indicated, it may be obtained by the use of such medicines: and I need not say that particularly by this means any preternatural increase of the activity, or of the active powers of the system, may be thus greatly diminished.

It is at the same time however to be remarked, that although by purging a great debility of the system may be induced, it may not produce any great evacuation of the sanguiferous system. A large evacuation by stool may sometimes be merely of the contents for the time present in the intestines, and therefore not drawn from the blood-vessels: and though the evacuation may be still larger by what is drawn from the mucous follicles, this we know may be very copious from the matter contained in the

follicles themselves, without much liquid being drawn from the blood-vessels. The evacuation indeed may also be increased by what is drawn from the arteries by the exhalant vessels; but as this must be drawn off slowly in very divided portions, it can have little effect, and at least no sudden effect in the depletion of the sanguiferous system: and from the whole it will appear, that the evacuation by stool may be very large, without much effect in taking off the tension and tone of the blood-vessels. In this respect, indeed, it seems to fall far short of the powers of blood-letting, though this be contrary to the common opinion, and even contrary to the practice of Sydenham: for in truth we have not found purging to be of so great effect in taking off the phlogistic diathesis of the system as the other.

Besides the general evacuation of the whole system, purging is powerful in changing the distribution of the blood into the several parts of it.

The circumstances according to which the distribution of the blood is made into the several parts of the system, we suppose to be commonly known, and to this effect; that if an evacuation is made from one set of vessels, the afflux of fluids will be increased in these, and that the afflux into other parts of the system will at the same time be diminished. Upon this principle it will be readily understood, that if the afflux of fluids in the descending aorta is increased, as it must be by purging, the afflux must in some proportion be diminished in those vessels which carry the blood to the head. By this the quantity and impetus of the blood in the vessels of the head must be diminished by purging; and hence it is that this operation of cathartics has been found so extremely useful in the diseases of the thorax.

With respect to the choice of purgatives, the neutral salts have been usually preferred.

As they do all that can be effected by an evacuation from the intestines, without acting strongly upon the moving fibres, they give no stimulus, or at least no inflammatory stimulus, to the whole system, and are therefore most usefully employed when any phlogistic diathesis prevails in it.

The whole of the neutral salts may be employed for these purposes, but some of them more conveniently than the others.

That formed of the fixed acid of vitriol with the vegetable fixed alkali,* from its being of difficult solution, is not a convenient medicine; but if the neutral be formed of the sulphureous, or volatile vitriolic acid, when it comes under the title of Sal polychrestus,† this, to persons who can bear its odour, taken from one drachm to four, proves a very convenient laxative. But I must remark here, that those apothecaries mistake the matter much who take the residuum of the distillation of Glauber's acid of nitre for the sal polychrestus.

The vitriolic acid with the fossil alkali,‡ gives the neutral, named Glauber's salt,§ in very frequent use; and which indeed, on every occasion, serves the purpose of the neutrals.

It is now well known, that such a neutral may be made of the vitriolic acid with either the fossil alkali or with magnesia alba;|| and from every observation I can make, there seems to be no difference in the two compositions for all the purposes of a neutral salt.

The nitrous acid with either of the alkalies give laxa-

* Potash.

† Sulfat of potash.

‡ Soda.

§ Sulfat of soda.

|| Carbonat of magnesia.

tive neutrals; but they are not conveniently employed in practice, because the quantity that is necessary to be a laxative dose is commonly very disagreeable to the stomach.

The muriatic acid gives neutrals which may be employed when largely diluted; but to most persons the salt taste is disagreeable, and large doses are ready to excite an uneasy thirst, that continues after the operation of the salt is over.

The vegetable acids, either native or fermented, give neutrals that may be employed; but they are not very powerful, and therefore seldom conveniently used as laxatives.

It is the acid of tartar* that gives some of the most convenient laxatives; and they are prepared by saturating the crystals with the quantity of alkali necessary to render the whole exactly neutral. For this purpose, either the fixed vegetable or fossil alkali may be employed. The former gives the tartarum solubile, or alkali tartarisatum;† and the latter gives the sal rupellensis, or natrum tartarisatum.‡ The tartarum solubile is not easily brought into a crystalline state, or kept in a dry form; whilst the sal rupellensis has not either of these disadvantages. It is of a less disagreeable taste than almost any other neutral; and as answering every purpose for which these can be required, I expect it will come to be very generally employed. As the acid of tartar is of a weaker attraction than almost any other acid, so it may be often dislodged by the acid of the stomach, and this often renders the operation of the tartarum solubile less certain, as the combination of the alkali with the acid of the stomach is a less powerful laxative; but the sal rupellensis is not liable

* Tartarous acid.

† Tartrite of potash.

‡ Tartrite of soda.

to this disadvantage, as the acid of the stomach combined with the fossil alkali is still a tolerably powerful laxative.

The next that presents itself to us is rhubarb. Much pains have been taken to ascertain the species of this genus that gives the root which the physicians of Britain have considered as the species of greatest value, and such as has been imported under the name of Turkey rhubarb. Whether this may be exactly determined or not, I cannot clearly judge; and in the mean time, I do not think it necessary to prosecute the matter farther with any anxiety, as we have now got the seeds of a plant whose roots, cultivated in this country, show all the properties of what we considered as the most genuine and valuable rhubarb; and which, if suffered to grow old, and being properly dried, will in time supersede the importation of any other.

The qualities of this root are that of a gentle purgative; and so gentle that it is often inconvenient, by reason of the bulk of the dose required, which in adults must be from half a drachm to a drachm. When given in a large dose it will occasion some griping, as other purgatives do; but it is hardly ever heating to the system, or shows the other effects of the more drastic purgatives.

The purgative quality is accompanied with a bitterness, which is often useful in restoring the tone of the stomach when it has been lost; and for the most part its bitterness makes it sit better on the stomach than many other purgatives do. Its operation joins well with that of the neutral laxatives; and both together operate in a lesser dose than either of them would do singly.

The present is an excellent formula,

R Rhei pulv. scr. ʒ.

Potas. sulphat. scr. ʒ.

Aq. Cinnam.

Aq. Menth. Pip. *aa* dr. 7.

F. Haustus.

That is, take of

Rhubarb—a scruple.

Vitriolated Kali—a scruple and a half.

Cinnamon Water.

Simple peppermint water, equal parts — seven drachms.

To make into a draught.

Sometimes, to quicken its operation, addere liceat,

Antim. tart. gr. $\frac{1}{2}$

It is proper to add of

Tartarised antimony—half a grain.

Vel Jalapii pulv. gr. 6.

Or, of Jalap in powder—six grains.

Vel Hydrar. submuriat. gr. 2.

Or, of Calomel—two grains.

The next purgative which claims our consideration is jalap. Here is a medicine of certain and great efficacy. Even to the eye-sight the entire root contains a resinous part; which can, in considerable quantity, be extracted from it by spirit of wine, leaving the residuum nearly quite inert. The resin thus separated is an acrid inflaming matter, which, thrown into the stomach, proves a drastic purgative; but it is rendered milder by being divided by a triture with any hard powder before it be exhibited. It is certainly by a resinous part that the entire jalap proves purgative, and in large doses proves a strong one; but as it is given in powder, the previous triture, by dividing the resin, renders the entire jalap a milder medicine than the resin taken separately. It may be given to persons not very irritable,

to half a drachm for a dose, but lesser doses will commonly answer; and while it very certainly operates, it is commonly without violence, and often without griping. If it be well triturated, before exhibition, with a hard powder, and the crystals of tartar* are the fittest for the purpose, the jalap will operate in lesser doses than when taken by itself, and at the same time very moderately and without griping. Except when given in very large doses, I have not found it to be heating to the system; and if it be triturated with a hard sugar, it becomes, in moderate doses, a safe medicine for children, which in this form they will readily receive, as the jalap of itself has very little taste.

While jalap may be thus rendered mild and safe, it may, however, by being given in large doses, and especially by being joined with calomel, which has no taste, be rendered one of the most powerful purgatives, and, if we mistake not, more safe than any of the other drastic purgatives.

For the sake of dear children, whose reasons are not strong enough, nor our influence over them, often sufficient, to get them to take nauseous medicines, I must add one more purgative, which is sufficiently mild and quick, I mean senna†, which may be made into tea, sweetened,

* R Jalap pulv.—gr. 8.

Potas. super. tart. pulv.—dr. $\frac{1}{2}$.

F. pulv. statim sumend.

That is, take of

Jalap in powder, eight grains.

Crystal of tartar, half a drachm.

Make into a powder to be taken immediately.

† Take of the leaves of senna, deprived of the stalks, a drachm, and pour boiling water over it, and give a cup of this occasionally. How far preferable is this to the common practice of always giving *calomel* only, because children will take it, forgetful of the frightful consequences that often ensue.

For grown up persons the following are the best formula :

and milk put to it, or cream, when it becomes, if not made too strong, sufficiently palatable, and a cup may be given every hour and a half, until it operates.

SECT. LXXXIV.

Blistering, and other Topical Applications.

It might appear at first sight, that blistering is not the abstraction, but the addition of a powerful stimulus, and as such it is sometimes given to rouse the animal œconomy. Its first action is certainly that of stimulating; but in this it invites the blood to the surface, deriving from the part most suffering by inflammation, and by its action expends the irritable principle, which becomes engaged in pouring out serum under the cuticle, and hence the abstraction of so much of a stimulus, thereby discharged. It is a kind of

R Infus. sen. unc. 3.

Antim. tart. gr. 1.

M. F. Haustus statim. sumend.

That is, take of,

Simple infusion of senna—three ounces.

Tartarised antimony—one grain.

To be made into a draught, to be taken immediately.

Or,

R Inf. sen. simp. unc. 3.

Sodæ sulphat. unc. $\frac{1}{2}$.

Sp. Piment. dr. 2.

F. Haustus statim. sumend.

That is, take of

Simple infusion of senna—three ounces.

Vitriolated natron—half an ounce.

Spirit of allspice—one drachm.

To be made into a draught, to be taken immediately.

half bleeding, The after process of healing is another expense of the irritable principle.

Where the throat is inflamed, hartshorn and oil mixed in equal parts, and put upon a flannel, is an excellent application round the throat.

From this principle blisters are put behind the ears for inflammation of the eyes, and setons are cut in the neck.

There are, however, other applications in use, which directly meet our principle. In inflammation of the liver it is customary to apply wet cloths dipt in a frigorific mixture over the abdomen, and as often as the cloths get warm fresh cooling applications are applied. This was lately done by Dr. Garthshore, in a case of peritonæal inflammation, which in half an hour produced the greatest ease, and sunk the pulse from a hundred and twenty to ninety. This practice is new, and deserves every attention.

In inflammation of the eyes there is nothing so good as keeping a rag constantly wet over the eye, the usual application is rose water.

The effect of a poultice seems to be founded entirely upon this principle, for it seldom, when first put over an inflamed part, is more than ninety-seven degrees of heat, and soon sinks below that, and the quantity of aqueous matter, rising in the form of vapour, produces an additional abstraction of heat.

Blisters are now called *Emplastrum Lyttæ*.

SECT. LXXXV.

Refrigerants.

These are medicines supposed, as their title implies, to diminish the heat of the living body.

As the neutral salts, which are the refrigerants chiefly

employed, do, upon being dissolved in water, generate a considerable degree of cold; so it has been supposed that they may in like manner generate cold in our bodies, and therefore produce their effects as by an actual cold applied. See Brocklesby's Observations, p. 122.

This conclusion, however, will readily appear to be mistaken, when it is considered that the cooling power of these neutral salts in water appears only during the time of their solution. When taken indeed undissolved, they may, as in Brocklesby's and Alexander's experiments, generate cold in the stomach, and from thence have particular effects; but as after solution they produce no permanent cold, so, when taken in a dissolved state, as they commonly are, their refrigerant powers cannot be ascribed to any actual cold applied.

The conclusion drawn from their solution in water, further appears to be very erroneous, from this; that acids, which are as powerfully refrigerant in the human body, as the neutrals, do however, upon being mixed with water, always generate heat; and even the neutral salts, when any how deprived of the water necessary to their chrystalline state, do, upon that water's being restored to them, always generate heat. It is not, therefore, any thing in the nature of the saline matter, that has a power of generating heat or cold in water or other bodies, but that the appearance of such a power depends entirely upon the circumstances of solution or mixture, and appears no longer than these circumstances subsist.

They produce, upon this principle, however, great good in inflammations of the fauces, and I have known a sore throat in the forming stage, cured in a few hours, by putting pieces of nitre in the mouth, which gradually dissolves, and the saliva is swallowed. I have found it almost an infallible preventive.

At the head of the list of refrigerants, acids are usually placed; and although these might come under some other of our general titles*, I shall here consider all their several powers and virtues as refrigerants.

It might be expected that I should here, in the first place, enumerate all the several substances which may be, and generally are, comprehended under this general title; but this, I find, would be a difficult, and we hope it is an unnecessary work. The chemists of late have been discovering a great number of different species of acids that were not known before; and it is probable that their inquiries are not yet finished; but in the mean time, it appears, that although it was very proper for the purposes of chemistry to mark and ascertain the diversity of acids, yet as few of the whole number have been employed as medicines, and that we are at least uncertain how far several of them may be employed as such, it does not seem necessary for us to take notice of any but those which we know to have been employed in the practice of physic.

In doing this, we shall in the first place mention the medicinal qualities which we suppose to be in common to all the species of acids employed in physic; and shall afterwards consider how far these qualities may be anywise different in the particular species.

Upon this plan, the quality first to be mentioned is that of their refrigerant power. This we suppose to be established by the experience of all ages; and practitioners still constantly employ them in every case in which the heat of the body is preternaturally increased; and although there may be some of the other qualities of acids which may not be suited to the constitution of certain persons, yet as to this quality there are hardly any exceptions.

* As a tonic.

These effects, however, are not very evident to our senses, nor are easily subjected to experiment; because they cannot be remarkable in consequence of any one exhibition; and the effects are only found in consequence of frequent repetitions. It is proper, therefore, that we should confirm it by other observations.

One is, that any preternatural heat arising is accompanied with thirst, which especially directs to the choice of acids; and as instincts may be commonly supposed to be suited to the purposes of the animal œconomy, so this desire of acid is presumed to be a proof that these are suited to moderate the heat that is the cause of thirst.

Another consideration may be, that acids especially abound in warm climates and warm seasons; and, therefore, that Nature has made this provision of what is suited to moderate the heat of the human body, arising in such climates and seasons.

Vitriolic Acid.*

When it is to be employed for internal use, it must be largely diluted with water; and the dispensatories have

* Vitriolic acid (new name, the acidum sulphuricum) is generally in a liquid form. It exists in various metallic and earthy bodies, but is chiefly obtained from green vitriol, and from sulphur; 16 oz. of the latter, forming 9 oz. of the acid.

It is the strongest of all acids, and has the greatest specific gravity; the proportion of which to distilled water, is as 1800 to 1000. It generates much heat with water; becomes dulcified, that is, loses its acidity, when incorporated with spirit of wine; dissolves iron, zinc, and copper, and with boiling heat may be united to all metals. It corrodes all animal and vegetable substances, checks fermentation, and neutralises alkalies; and will become the volatile, by mixing it with liver of sulphur, made with caustic alkali; but in this volatile state its affinities and powers are much diminished.

ordered seven or eight parts of water to be added to one of the concentrated acid. The proportion of water is not a matter of much nicety ; but it is proper for the sake of prescribers that it should be fixed, which, however, cannot be done without determining the specific gravity of the concentrated acid, which neither of the colleges have done.

Even the diluted acid is seldom employed in any precise dose, but mixed with water, or with tinctures or infusions, in such quantity as the patient's palate will easily bear. This, however, is a very inaccurate practice, as it generally occasions the dose of the acid to be too small. In my opinion, it would be better to fix the quantity of acid, and leave it to be diluted to what the patient's palate may require.

The simple acid properly diluted, and sweetened perhaps, with a little sugar, is generally grateful to the palate, and is of service in quenching thirst. When it is carried down into the stomach, it is useful in curing the

Stahl, the scholar of Becher, and promulgator of the phlogistic doctrine, derived the vitriolic acid from sulphur, deprived of phlogiston. The French chemists declare it to be a compound of sulphur, a simple substance, and oxygen, attracted from atmospheric air during combustion.

Diluted or vitriolic acid, (new name, *acidum sulphuricum aqua dilutum*).—This was lately called *spiritus vitrioli tenuis*, and is frequently ordered instead of the *elixir vitrioli acidum* of the former dispensatory. The dose may be from 10 to 30 drops.

The following is an excellent formula :

℞ Infus. rosæ unc. 7.

Soda sulphat. unc. $\frac{1}{2}$.

Capt. coch. larg. 4. sextâ quâque horâ.

That is, take of

The infusion of roses—eight ounces.

Vitriolated natron—half an ounce.

Take four table spoonsful every four hours.

nausea which arises from any putrid matters there; and either by this means, or by its stimulus applied to the stomach, it excites appetite, and consequently promotes digestion.

I have never found that, in any quantity, the vitriolic acid mixed with the bile proved laxative, as the vegetable acids so readily do.

*Nitrous Acid.**

This acid, from its being so commonly employed in chemical operations under the title of aquafortis, has probably, from the opinion of its corrosive nature, prevented physicians from employing it as a medicine. This however was a mistake†; for this acid, properly diluted, may

* Nitrous acid, (new name, acidum nitricum).—Nitre is a neutral salt, composed of an acid and an earthy basis, impregnated with animal or vegetable matter. This acid may be separated by the force of fire, but is much more easily obtained by the assistance of a proper quantity of vitriolic acid; the latter having a greater affinity to the alkaline parts sets free the nitrous acid, which, by distillation, is carried over into the receiver.

This acid is commonly in a fluid state, of a reddish colour, and emits noxious fumes; it is specifically lighter than vitriolic acid, effervesces strongly with oils and vinous spirits, dissolves most metallic, and all kinds of animal and vegetable substances, generates cold, increases inflammability, and promotes fusion. Exposed to intense heat, it produces a large portion of pure air: $13\frac{1}{2}$ dr. of this acid will saturate 1 oz. of salt of tartar, or prepared kali. The more concentrated it is, the more volatile, the more diluted, the more fixed. The specific gravity to the weight of distilled water, is at 1550 to 1000.

Diluted nitrous acid, (new name, acidum nitricum aqua dilutum).—The vapour which rises in mixing these fluids, is nitrous acid air. This acid is used as a menstruum, and in a few particular preparations.

This is used as the vitriolic acid, but in a larger dose.

† It has of late been so much employed in lues venerea, that we may in future venture more freely upon its use, and probably greatly augment the quantity given of the other mineral acids.

be very safely employed, and has all the powers and virtues of acids in general. Though the instances are few, there is one in Boerhaave's *Nitrum Nitratum*, in which the acid is in greater proportion than is necessary to saturate the alkali; and I have frequently, says Cullen, employed it as a grateful and cooling medicine.

Muriatic or Marine Acid.*

In the last century Glauber took great pains to introduce the use of this acid, ascribing many virtues to it both in

The proper formula may be,

R Acid. nitros dr. $\frac{1}{2}$.

Decoct. hordei. lb. 2 M.

Bibat æger quotidie, ope tubuli vitrei, a libra una ad libras duas usque.

That is, take of

The nitrous acid—half a drachm.

Barley water, or thin gruel—a quart, thin.

Let the patient drink, by means of a glass tube (a quill may serve the purpose) from one to two pints daily.

At present cremor tartar drink is very common.

* Muriatic acid, or marine acid (*acidum muriaticum*) is generally procured from sea salt, which is compounded of fossil alkali, or natron, and muriatic acid. It may also be obtained from vegetables, fossils, urine, soot, &c. In this process likewise the vitriolic acid is commonly employed to decompose the salt, and to set the marine acid at liberty. The neutral salt left in the retort is, when cleansed, the vitriolated natron, or Glauber's cathartic salt, viz. the alkaline basis of the sea salt, and the vitriolic acid united.

The marine acid acts readily on metallic bodies, and has a greater affinity to most of them than other acids. It does not touch gold in its metallic state, except mixed with eight times its quantity of the nitrous acid, which forms an aqua regia. It mixes readily with spirit of wine, and affords a true æther. When concentrated, it is of a yellow colour, and oily particles float on its surface. Its specific gravity to that of distilled water, is as 1170 to 1000.

diet and medicine. Hence it happened that physicians employed it a good deal in the diseases of the stomach; and many have been of opinion, that in restoring the tone of the stomach, it operates more powerfully than the vitriolic; but as the latter can be more easily brought to a standard than the other, it has entirely thrown this other out of our practice. Although the London college, in the last edition of their Dispensatory, have omitted both the simple spirit of salt and the spiritus salis dulcis, yet the Edinburgh College have retained both; and wherever the latter is employed, I consider it as an employment of the acid; for, in the ordinary preparation of it, the qualities of the acid are never entirely destroyed.

But the most remarkable instance of the employment of this acid was in the *tinctura aperitiva Moebii*, which Dr. Hoffman informs us was, in the course of the last century, much employed and celebrated for its virtues. Dr. Hoffman informs us that it consisted of a solution of common salt super-saturated with its acid. I have frequently employed it by making a solution of half an ounce of good bay salt in four ounces of water, adding to this two drachms of a well-rectified spirit of salt: and this given in a tea spoonful or two in a glass of water I have found useful in improving appetite, and frequently in stopping vomiting.

Acids I shall consider as three kinds; the native, the distilled, and the fermented.

The native acids are chiefly those found in the fruits of plants, sometimes however also in the leaves and roots. They are in different degrees of acidity, and different by the texture of the fruit in which they are lodged; and still more considerably by the various matter adhering

This is the weakest of the mineral, but stronger than the vegetable acids, and is chiefly used as a menstruum. It is given to adults in doses of 10 to 40 drops, or more, with draughts of diluting liquors.

to them, both in the fruits and in the juices expressed from these.

The effects of these different conditions in the use of them as aliments, I have endeavoured to explain when treating of them above; but, as medicines, I do not find that I can apply any distinction of them. Although they may be distinguished in a chemical view, I do not find that I can apply such distinctions to the purposes of medicine; and that, with a view to this, I must consider them in general, and merely as acids. In considering them, therefore, as medicines, I must observe, in the first place, their refrigerant power; and that, especially upon account of the quantity in which they may be given, they are the most effectual of any we can employ. As we have said above, that they enter into the composition of the animal fluid, and thereby diminish the putrescent tendency of this, they, therefore, as I judge, obviate the heat that might otherwise arise: and it is in proof of all this that they are the most ready and certain cure of scurvy.

The same acids are never in such a concentrated state as to show any caustic or even stimulant powers; but they show readily the stimulant power which is in the weaker or much diluted acids, so far as they excite appetite and promote digestion; and probably it is by the same power that they excite the urinary excretion.

All these powers are to be ascribed to the pure acid that is in this native acid of vegetables; but it is now to be remarked, that in all of them, even the most purely acid, there is present a quantity of fermentable matter; and if this happens to be in large proportion, or even in small proportion, and thrown into the stomachs of an acient disposition, the acid undergoes a fermentation, which is attended with flatulency, a more powerful acidity, and all the other symptoms which we term Dyspeptic. This does not, however, much affect their refrigerant power, or

do much harm to the system, except in those cases of gout and calculus renalis, in which the taking down the tone of the stomach may be very hurtful. It seems to be in consequence of this acescent disposition of the stomach that a more copious acidity, and perhaps of a peculiar kind, united with the bile, forms a laxative, which may occasion more or less of diarrhæa, and the cholic pains which so frequently accompany the operation of laxatives.

Distilled Acid of Vegetables.

All vegetables, except mushrooms, if these be truly such, when treated by distillation without addition, give out, in the first part of the distillation, a quantity of acid, and continue to give out more during the whole of the distillation. This acid is somewhat different according as it is drawn from different vegetables: but that difference has not been ascertained; and we know them even in chemistry, and more certainly in medicine, only by the common quality of acid.

This acid has been but little employed as a medicine, and has hardly been remarkable but by its late use in the form of tar-water. In making tar, it is exhaled from vegetables whilst they are burnt, in the same manner as in the distillation above mentioned; and accordingly, in the making of tar, an acid water is found in considerable quantity in the same ditches that are prepared for receiving the tar during the burning of the wood. In the countries where tar is prepared, particularly in North America, this acid was accidentally employed as a medicine. It was found to prove very useful; and the benevolent and worthy Bishop Berkeley being informed of this, was desirous of rendering such a medicine very generally known. But as the water collected, as we have said, during the burning

of the wood, could not properly or conveniently be obtained in Britain, he perceived that a quantity of the acid remained in the tar as it was imported, and conceived that it might be extracted from it by infusion in water. It is such an infusion that gives the celebrated tar-water which has been so much talked of.

It was at first by many persons celebrated as a very valuable medicine; and, from my own observation and experience, I know it in many cases to be such. But, as happens in all such cases, the commendations of it by the patrons and favourers of it were very often extravagant and ill founded; and though the persons who disparaged it had some foundation for their opinions, yet they also told many falsehoods concerning it.

Although it would have been difficult, at that time, to balance between these opposite accounts, yet, in the course of sixty years, the matter has found its own balance. The excessive admiration of it has entirely ceased, and the most part of practitioners, from causes we could assign, have neglected the use of it; but there are still many judicious persons who believe in and employ its virtues. In many instances this preparation has appeared to strengthen the tone of the stomach, to excite appetite, promote digestion, and to cure all the symptoms of dyspepsia. At the same time it manifestly promotes the excretions, particularly that of urine, and the same may be presumed to happen in that of others. From all these operations it will be obvious, that in many disorders of the system this medicine may be highly useful.

It may be however, and has been a question, upon what, in the composition of tar-water, these qualities depend: and I have no doubt in asserting that it is entirely upon the acid produced in the manner above mentioned. Mr. Reid, the author of a dissertation on this subject, has

rendered this sufficiently probable, from the accounts of Glauber and Boerhaave with respect to the virtues of such an acid, and from the opinion of the Bishop of Cloyne in preferring the Norway tar to that of New England, as the acid part is not taken from the former so entirely as it is from the latter; and he also properly supports it by this, that any other parts of the tar-water which may be found in it, unless carefully separated, are commonly very hurtful.

Upon the first introduction of tar-water, some physicians were of opinion, that it derived part of its virtue from some oily matter in its composition; but it would not be difficult to show, that this, in many respects, is very improbable, and that, upon the contrary, the presence of these oils, as Mr. Reid has particularly pointed out, is frequently pernicious. But to supersede all controversy on this subject, I can assert from much experience, that the tar-water, as it abounds in acid, and is more free from all oily matters, is the most effectual medicine; and I have this clear proof of it, that when, instead of extracting the acid by infusing the tar in water, I procured it by distillation from solid fir or other woods; and, by taking only the first part of the distillation, I obtained the acid as free as possible, from all oily matter. I found that by employing this acid as a medicine, properly diluted with water, every virtue appeared that was ever found in any tar-water. In this practice I found a particular advantage, as I could, by a proper rectification and concentration, bring the acid into a small bulk: which being readily portable, is, on occasion of journeys, or other circumstances, rendered very convenient. But it is very necessary to observe here, that this acid, to be rendered a very useful remedy, must be always largely diluted with water; and how much the water may

favour its operation, in every respect, will be sufficiently obvious.

Acids of Vegetables.

This is the well known liquor named Vinegar, the preparation of which need not be given here. As it is found in our houses and shops it is in different conditions, the causes and circumstances of which are not well ascertained; and we can only judge of its purity by the sharpness of its acid taste, and its being free from all others.

As this acid is prepared by fermentation, it is always in a diluted state; and, both for the purpose of medicine and of pharmacy, it has been desirable to be obtained in a more concentrated condition. The purposes and the execution of this are various; but the most ordinary practice has been by distillation, which seems to me not to be the most proper; for the distillation cannot be practised without the acids becoming empyreumatic, which always renders it a disagreeable medicine; and at the same time, by the ordinary practice, the acid is hardly, or not at all, rendered stronger than it might have been by a proper fermentation. The directions of the London College I could never follow with any exactness; and I have always found, that before the aqueous part be drawn off, an empyreuma is communicated to the whole liquor.

The Edinburgh directions may be exactly executed; but the empyreuma is made very strong, and at the same time the distilled acid, as I have said, is hardly stronger than it is in good vinegar; and I know of no advantage that this distilled acid has over the other.

If a concentrated vinegar is much to be desired, there are two other ways of obtaining it. The one is by freezing,

which has now been frequently practised in the northern countries of Europe; and the management of it is prescribed in many books of chemistry, that I believe are almost in every body's hands.

The other means is by a distillation from any neutral containing this acid, by the addition of a strong vitriolic acid. This gives a very volatile acid, which by its volatility may be applied to several purposes; and by its being in a concentrated state, it may be, by a proper dilution, applied to every purpose of medicine that the fermented acid of vegetables is fit for.

It is true that this distilled acid wants some substances which are joined with it in the vinegar prepared by fermentation; and Dr. Boerhaave insinuates that some virtues may be derived from these. I have not, however, truly perceived them; but allow, that if there are any such advantages to be desired, they may be more certainly obtained by employing the vinegar concentrated by freezing.

After these remarks upon the different management of this acid, I proceed to consider its virtues. It is certainly a refrigerant power, which we conclude both from experience and from its antiseptic powers; and it has this advantage over the fossil acids, that it can be thrown in, in much larger quantity, and with more effect, as it enters into the composition of the animal fluid. It is grateful to the palate and stomach, and certainly stimulates the latter so far as to excite appetite. By the same stimulant power it acts upon the mucous excretories of the mouth and fauces; and at the same time it seems to act as an astringent on the blood-vessels of these parts, and proves useful in the inflammatory affections of them. When it is carried in large quantity into the blood-vessels, a portion of it passes off by the excretions, and proves manifestly diuretic.

It is celebrated also for its diaphoretic and even sudorific virtues; and these are commonly ascribed to its power of dissolving the fluids. But this, upon the general principles which will be explained hereafter, we must deny; and if it ever has appeared to have this effect, we must impute it to its refrigerant powers on the stomach, and its gently stimulant powers in the whole system, assisted by a sudorific regimen.

We have now mentioned most of the acids that are well known in the practice of physic: but I must own that there are many others which have been sometimes employed, and may, I believe, deserve to be enquired after, but I own that I find the facts too few to determine the matter clearly, and at least that I am too little acquainted with these facts to be able to speak positively on the subject.

Of the large list that might be mentioned, the only one that I am disposed to take notice of is the

Acid of Borax.

This was the invention of the celebrated Homberg; and, as he imagined it to be possessed of strongly sedative powers, he gave it the name of *Sedative Salt*. Upon such an authority it was introduced into practice; and such is the favour for a new medicine, and such are the excuses so readily found for its failure, that it soon came to be much employed in France; and Mr. Geoffroy having found a cheaper method of preparing it, the government ordered, at their expence, that it should be furnished to all the medicine chests of the army and navy.

This certainly gave an easy opportunity of trying its virtues; but we have hardly ever had any favourable reports of these from France, or from any other country of Europe; and it

appears that the practice with it has ceased every where ; and long ago Mons. de la Mettrie has, in disparagement of our art, observed, “ *Que le sel sedatif n'est pas pas aussi sedatif qu'autre-foi.*” “ That the sedative salt is not as sedative now as formerly.” To all this I could add my own experience, which has shown me, that even in large doses this salt has but slight if any effect on the human body.

Neutral Salts.

The next set of refrigerants I am to speak of, are the neutral salts ; and these, with acids, are certainly the refrigerant remedies we chiefly depend upon in practice. The refrigerant power seems to be in common to every neutral, so far as we have yet tried them, except those neutrals composed of the muriatic acid and fossil alkali, and perhaps some other acids which carry into the composition of neutrals some other matters of an acrid kind ; but these are not well ascertained ; and we take it for granted that it is of the nature of a neutral salt, composed of an acid and alkali, with the exception mentioned, to give a refrigerant substance.

This power in these salts is a matter of common experience, and may be presumed from their antizymic and antiseptic powers ; but in what proportion it is in the several species, is not exactly ascertained, though Dr. Smith, in his experiments, has done somewhat to this purpose. In the Doctor's experiments it appears, that, except in common salt, some sedative power in every one takes place. In these, indeed, composed of the fossil alkali, some stimulant power appears upon their first application ; but soon after this, their sedative power becomes manifest, by their destroying the irritability of the part. After all,

however, I cannot apply these experiments so as to explain the respective powers of these salts, as they appear in the practice of physic. It appears here, that all of them, which show a sedative power in Dr. Smith's experiments, when thrown into the stomach, produce a disposition to sweat. The prejudices of practitioners, at present, are in favour of the neutral formed of the native acid of vegetables with the fixed vegetable alkali; and while this is the most agreeable, I have no objection to its being the most commonly employed in practice: but I make these observations to show country practitioners, that when they happen to be in want of lemon juice, they may employ any other acid, except the muriatic, to form neutrals that may answer the same intentions: and a very little chemistry will teach them every thing else that may be here necessary. In the time of our last wars upon the continent, our practitioners frequently employed the vitriolic acid, and which was indeed employed in making the original antiemetic draught of Riverius.

With regard to particular neutrals, I have a few observations only to make. I have said just now, that the vitriolated tartar may be employed as a refrigerant; and as it is thereby diaphoretic, it is employed in the composition named after Dr. Dover.

The sal mirabile is almost only employed as a purgative; but that it has refrigerant powers, appears from the intestines being left, after the operation of this purgative, in a lax and flatulent condition.

What is named the secret sal-ammoniac is little employed in practice; but there is no doubt that it is nearly of the same nature with the common ammoniac.

Nitre has been commonly esteemed as the most powerful refrigerant; and from Dr. Smith's experiments, as well as from those of Mr. Alexander, it appears to be so. But

as all refrigerants produce a determination to the surface of the body ; so, before this operation, they prove directly stimulant to the stomach and alimentary canal : and in this way nitre is as remarkable as any other ; and it is therefore, in large doses, very often uneasy and painful to the stomach. When it is therefore necessary to continue its operation as a sudorific, it is at the same time necessary to give it in divided doses, and at proper intervals.

I do not doubt but the practice of Dr. Brocklesby may be often successful ; but I could never find it convenient to imitate it, as I could hardly, or at least seldom, find a stomach that would bear half the quantity of nitre that he seems to have employed ; and in most cases I have been limited in the doses of nitre that I could exhibit. I believe that the employment of nitre, as recently dissolved, will be a more powerful refrigerant* than when the solution of it is entirely finished ; but I am of opinion that the practice has no advantages to compensate the inconvenience that sometimes attends its exhibition.

I have so seldom employed the cubic nitre that I know little of its qualities and powers.

Of the peculiar power of neutral salts formed of the muriatic acid, I have had occasion already to remark, that by Dr. Smith's experiments, common salt composed of the muriatic acid and fossil alkali is the neutral which, applied to the nerves or other irritable parts, shows a strongly stimulant power, and is therefore to be thrown out of our list of refrigerants. Its stimulant power seems in part to be owing to the fossil alkali in its composition ; for this

* Dr. Percival made many accurate observations on nitre, and he found it to increase the force of the circulation, and hence he excluded it from the class of refrigerants. Given, however, in the way recommended, it may act like *Ice*, a very powerful and common remedy in Italy, and perhaps iced water might be very usefully employed in this country.

alkali, joined with the nitrous or vegetable acids, do also, in the first application to the nerves, in Dr. Smith's experiments, show somewhat of a stimulant power, which however soon passes away, and they afterwards prove manifestly sedative. These neutrals, therefore, consisting of the fixed vegetable or volatile alkali, though formed by the muriatic acid, may be taken into our list of refrigerants; and their common employment as sudorifics, which they generally produce, is only to be explained upon this ground.

The use of the common ammoniac has been otherwise frequent in practice; but what are its peculiarly useful powers, I dare not determine. Its resolving powers, by attenuating or dissolving the fluids, I do not admit of; but that, like other saline matters, in passing by the excretions, they are suited to promote these, may be really allowed.

The neutrals composed of vegetable acids must be different according to the species of this acid employed: but they are all in general refrigerant and diaphoretic, and we know them only in that light. The one most frequently employed is that composed of the native acid and the fixed vegetable alkali, commonly known under the name of the Saline Mixture. The acid commonly employed is the juice of lemons; but that only because a quantity of acid juice is most easily obtained from that fruit. I have frequently known employed the expressed juice from several other fruits, which the country practitioner might use in case of the want of lemons; and I have frequently known employed the juice of apples with equal advantage.

It is hardly necessary to say that the alkaline salt of wormwood, so frequently employed before, be now used, as the purer the alkali the medicine is the better.

This neutral salt, formed and given in due quantity, is, for what I can perceive, equally refrigerant and sudorific as

any other, and has this particular advantage, that it is, or can be, easily rendered more agreeable than any other. In my opinion it is commonly given in too small doses, and at too great intervals ; and though given in large doses, it is not ready, to give uneasiness to the stomach. When given in quantity, its diuretic and purgative qualities appear as in the other neutrals.

It has been of late a favourite practice to give the saline mixture during the act of effervescence ; and besides the advantages of introducing a quantity of aerial acid, I am persuaded that the detachment of that acid in the stomach renders the whole of the mixture more refrigerant.

The neutral salts as purgatives, have been considered before. They operate upon the intestines, producing an easy, sudden, and copious discharge, is equally explainable upon our principle. For the water, after having performed its strengthening and exhilarating office upon the stomach, passes quickly into the intestines as fluids do, carrying along with it more or less of all its ingredients, but particularly its purgative. When there, the purgative, by its great dilution and consequent dispersion all over the internal surface of the canal, vellicates the innumerable little exhalent vessels, with which that cavity is crowded, into a plentiful secretion : and notwithstanding the stimulus may be but slight on any particular part, on account of the minuteness of the particles of the salt, yet as they are universally diffused, and act upon the whole system of exhalents at once, a more copious and expeditious evacuation is produced, than what is often attainable from a much larger quantity of any of the other more stimulating purgatives less attenuated ; attended at the same time with these important advantages ; that as the stimulus is gentle, no griping pain is likely to be excited ; and as it is superficial, the particles must soon be washed off in the general

current, without leaving behind them any of those disagreeable feelings that usually hang in the rear of other cathartics.

That the Cheltenham purgative owes its great superiority in the particular circumstances I have here described, chiefly to the principle of attenuation, will appear still more evident from comparing it with other purgatives of that class: as we find that according to the quantity of water they retain in their crystallization, and their consequent degree of solubility, the nearer and more remote in general is their resemblance to it in their mode of operation.

Authors seem to differ widely in their accounts of the quantity of water contained in the different purgative salts, and also concerning their different degrees of solubility; owing probably to a variety of little circumstances that affect their experiments at the time they are made. Such as the condition of the salt, and of its original constituent parts, the state of the atmosphere, the degree of heat, the quantity, if any, of the other contents separated along with the water, in the evaporation; the temperature and purity of the water used in the solution, with other particulars not easy to be attended to or accurately ascertained. But on comparing the different accounts, the following arrangement may, in a great measure, be depended on.

First, the Cheltenham salt may be placed at the head of all the usual purgatives of that class; its crystals being found to contain considerably above sixty parts out of an hundred, of pure water; and to be soluble in about an equal weight of that fluid. Next to the Cheltenham, may stand the pure Glauber salt; as the water in its crystals is found to amount to more than fifty out of the hundred; and to be soluble in a little more than double

their weight. Next to the Glauber, may rank the Epsom salt; its crystals containing somewhat under fifty of water. As to the solubility, it is said by some authors, that its crystals are more susceptible of solution than the Glauber salt, notwithstanding they contain less water in their composition. When so, the variation may be owing to a small commixture of other ingredients besides the magnesia earth and the vitriolic acid of which they are composed, as is not unusual in the native salts, conjoined with the feeble attraction that is known to subsist between its original constituent parts. After the Epsom comes the sea salt, but at great distance; as it is found to contain of water in its crystals, but sixteen parts out of the hundred; and requires above three times its weight for solution. Lastly, at the bottom of the scale, may be placed the vitriolated tartar; its crystals containing but six out of the hundred, and not being soluble in less than sixteen times their weight of water. As to the other artificial purgatives composed of the different acids united with the different alkalies; such as soluble tartar, diuretic salt, Rochelle salt, and the digestive salt of Sylvius; their places in the above scale, vary according to the various circumstances of their preparation.

Now we find by experience, that the operation of these different salts, when compared with that of the Cheltenham salt generally accords with the place in which they stand in the above arrangement. For example, if we take the second in the scale, the *Glauber salt*, and compare its mode of operation with that of the last, the *vitriolated tartar*, we find it approaches much nearer to the Cheltenham salt in all the recommendable circumstances before enumerated; notwithstanding it differs from the other, only in its having the fossil alkali, instead of the vegetable, united with the vitriolic acid in its composition. But as

its crystals contain a much greater proportion of water, and are much more susceptible of solution, its operation as a cathartic is gentle and expeditious, while that of the vitriolated tartar is rough and sluggish.

Upon the whole then, we may conclude, that the principle will extend to the saline purgatives universally, and may be applied as the criterion by which we may judge beforehand concerning their different modes of operation; their action being merely mechanical, and all the varieties of their operation to be accounted for from their different degrees of stimulus upon the fibres of the living subject.

Could any principles be found out that would apply to the vegetable and animal kingdoms, so as to explain in the same mechanical manner the effects of their operation; such a discovery would be of the utmost importance, as it would lay open the whole material world at once to the intelligent physician. He might then be truly styled the *minister naturæ*, as all her stores would be subject to his direction; and from that inexhaustible magazine he would be able to select on all occasions what was best adapted to his purpose, and to determine with precision what operation and what effects were to be expected in general from every medicine he administered.

But those curiously organized productions of nature are so very complicated in their construction, and the ingredients of which they are composed are so numerous, and so intimately and inextricably blended together, and at the same time acquire so many new properties from the manner of their arrangement, which on the slightest efforts to separate them are totally lost, that no just analysis of them has ever yet been made, or is ever to be expected: and without that, their mode of operation upon the living subject must ever remain in obscurity. Neither

can the medicinal store be very copious while it continues to derive its supply from mere accident, and the result of vague undirected experiment.

Whereas in the fossil kingdom in general, the compositions are comparatively simple, and the ingredients few and permanent. Their structure can therefore be easily unfolded, and their parts subjected to the various methods of examination without undergoing any considerable change by the process. We are consequently capable of obtaining an absolute command over that class of bodies; so as to be able not only to de-compose them, but to re-compose and restore many of the most useful among them to their original forms, as by the hand of nature, according to our occasions. From thence we are enabled to acquire a competent knowledge of their properties, both in their separate and aggregate state, and to ascertain and regulate their different modes of action, in all cases whatever.

In order to illustrate the distinction between those different classes of natural bodies, we need not go beyond the present subject of evacuation for an example.

The operation of the saline purgatives has been shewn to proceed from mere mechanical stimulus upon the sensible parts of the living body. But by what mode of action jalap operates as a cathartic, or ipecacuanha as an emetic, no satisfactory account has been given. Much less is any to be attempted for that extraordinary sympathy which confines the operation of each principally to its respective organ, whatever may be the channel by which it is introduced into the constitution. How for instance an infusion of jalap when injected by a vein into the course of the circulation, and consequently conveyed to every individual spot of the body, affects no one particular part till it is secreted and discharged into the alimentary canal;

and that there its operation should commence, acting ultimately as a cathartic. Or how an infusion of ipecacuanha, when injected in the same manner, suspends its action till it arrives at the same place, and when there should operate invariably as an emetic.

These wonderful facts seem totally inexplicable: and yet they are established upon the firm basis of experiment, as will appear from the following account communicated to me by my late friend Mr. John Hunter, whose singular talents for investigation have thrown a light upon the physiology of animals and indeed of most parts of organized nature, that has acquired him fame throughout Europe. The experiments were these.

He infused one scruple of jalap root in two ounces of water, and let it stand in infusion for about two hours. He then injected one half of the clear liquor into the crural vein of a dog. In less than a minute the dog puked a little, and then seemed to be quite well. Thinking therefore there would be no farther effect from that injection, he threw in the remainder, but no more puking ensued. However, by degrees, the dog grew dull and feeble in his legs, so as to be induced to lie down. After lying a little time he got up again, and in about a couple of hours after the last injection, he had a motion downwards; the first part of which was of the usual consistence; but the remainder was loose; and in about two hours more he had a very loose purging stool. He then gradually recovered, and seemed to continue pretty much as usual.

He in like manner infused one scruple of ipecacuanha root in two ounces of water, and then injected about one half into the same vein of a dog. The infusion was no sooner injected than the dog grew very sick, and before his mouth was untied he began to vomit; and the moment

after, he threw up every thing that was in his stomach, and continued sick, so as not to be disposed to eat for above a day afterwards.

These experiments clearly demonstrate our total ignorance of that class of bodies, their qualities and mode of operation; and that we must be indebted for our medicinal knowledge and application of them to accident alone.

Of the combination of acids with metallic substances. They are generally acrid and stimulant; and there are none of them that can be considered as sedative or refrigerant excepting the *sal plumbi*, or *saccharum saturni*: of which I shall speak hereafter.

The following formulæ may be directed:—

R Potas. subcarbonat. scr. 1.

Suc. limon recent. unc. $\frac{1}{2}$.

Aq. distil. dr. 10.

Syr. tolut. dr. 1.

Potas acetat. gr. 8, vel

—— tartrat. scr. 1, vel

—— sulphat. scr. 1, vel

Sodæ tartarizat. scr. $1\frac{1}{2}$, vel

—— sulphat. vitriolat. scr. 2.

Cetacei. v. o. s. scr. 1.

F. haustus, 4ta quaque borâ sumend.

That is, take of

Prepared kali—a scruple.

Fresh lemon juice—half an ounce.

Distilled water—ten drachms.

Syrup of tolu—one drachm.

Acetated kali—eight grains, or in lieu of it

Tartarized kali—one scruple, or

Vitriolated kali—one scruple, or

Tartarized natron—a scruple and a half, or

Vitriolated natron—two scruples.

Spermaceti dissolved in the white of an egg—one scruple.

To form a draught, to be taken every four hours.

THE AVOIDING OF STIMULI, BOTH DIRECT AND INDIRECT.

SECT. LXXXVI.

Regimen.

In the former parts of this work, we have shewn what were the stimuli, both direct and indirect, and we are here to call that knowledge into practice.

The purity of the air is not in the sthenic class of diseases to be an object of consideration; on the contrary, from facts before the public, it appears that great advantage might be derived from the employment of a reduced atmosphere, or one containing less oxygen, or even of some of the mephitic airs, as the hydrogen, hydrocarbonate, and fixed airs. But great caution is required in the exhibition of such active agents, unless it be in a state of the highest dilution.

We select the following as a very promising omen of success in cases of sthenic disease, published by Dr. Beddoes.

Dr. Thornton, physician to the Mary-le-bone General Dispensary, and lecturer on Medical Botany at Guy's Hospital, writes the following account to Dr. Beddoes:—

September 26, 1796.

Duke Street, Grosvenor Square

SIR,

MRS. LEWELLIN, ætat. 25, lives at Camden Town; she was brought to bed of her first child last July, and, having very sore nipples, she attempted, after a few days, to wean the babe, and for thirteen weeks kept it from the breast; during which time the milk was constantly produced in the greatest abundance, so that it run through every thing that was placed to receive it; notwithstanding nipple glasses, and that the milk was frequently drawn off by means of a glass pipe, by an obliging neighbour, inflammation gradually ensued, and it occupied the inferior half of both breasts, and, extending down to the umbilical region, was terminated by a distinct line. The babe was now applied to the breast, but would not take to it. The heat and pain became extreme. There were many knotty and hard tumors on both breasts. Matter ouzed out from the surface. The pulse was 110, full; perspiration constant and profuse; agony so great, that she was deprived of sleep; and the child not thriving; and continually crying in the night, increased the affliction. She had given up all hopes of recovery, or even outliving many days, when she applied to me; and her case seemed to authorize a new practice. Appearing too weak for the lancet, this remedy was precluded. As to evacuations, the same reason weighed also against that plan. The speediëst benefit, however, might arise from *disoxygenating* of the *blood*, and the case was urgent. I therefore filled a bell glass with atmospheric air, and burning two table spoonsful of æther in it, as it was suspended over water, I rendered it chiefly azote, and inflammable air. She persisted in inhaling this for about five minutes, standing up, until the pulse was obliterated; the eyes became dim,

and no longer represented the objects of vision; the face was deadly pale; and swooning coming on, she fell into the arms of a servant, and we placed her on a chair, and I opened the window to admit fresh air. In about ten minutes she revived; she fetched several deep sighs, and appeared faint, and still very languid. The pulse was feeble, and only 98; and for the first time, she said, for some weeks, she felt her breast cold and easy. I directed her, when she got home, to apply cloths wrung in yest to the inflamed surface; and I ordered an electuary three times a day of sulphur, and sulphurated kali; and on the sound part, round the inflammation, I directed half a dozen leeches to be applied; and to divert the current from the inflamed parts, I ordered a large burgundy pitch plaster to be placed betwixt the shoulders, which however acted like a blister. On the third day when I saw my patient, her spirits were revived; the vivid red colour was abated; the tumors of the breasts were softened; and the milk could be drawn off without torture. Mrs. Lewellin inhaled the air as before, but with less sedative effect; when I ordered four fresh leeches (for the others had died immediately after the operation), and the yest and electuary as before. On the fourth day there was no longer occasion for leeches, or the yest fomentation. The electuary, and a reduced atmosphere, were, however, continued; and in a week the cure was perfected; and the child was applied to the breast, and health and happiness were restored to both.

I have the honour to be, &c.

R. J. THORNTON.

Colds have been very speedily cured by the inhalation of a reduced air.

The exclusion of light is another essential circumstance.

The next consideration is heat. From attention to nurses*, and persons about the patient, the chamber in which the sick man lies is too often allowed to have a large fire. Even all the things are cooked there, to avoid the trouble of going down stairs. And practitioners admit this, sooner than offend the low talkative hirelings of the day, forgetful of the sacred duty they owe to the patient. Whoever, when in bed, has had a fire lighted in his room, cannot have failed to notice the excessive inconvenience that this additional stimuli has created. Not contented with this, nurses usually heap on clothes, that the patient may not catch cold, and the curtain is slyly drawn, in order that the dying man may not see the use made of his wine, and other things provided for his use. Whoever will peruse the work of Sydenham will find that his chief merit consisted in noticing the evil of too much heat, and he seldom would allow his patient even to lie in bed, and the room was constantly kept ventilated with cool air.

Conjointly with the first bleeding, the first vomiting and purging, with abstinence and watery fluids, it must not be forgotten, says Dr. Brown, that particular regard is to be paid to temperature†: for, if cold always debilitates, and if that is its proper operation‡, if it only seemingly acts otherwise, because heat succeeding to its action, or alternating with it||, renders its effect stimulant, if cold alone

* Nurses are to be considered as watchmen, and should be well clad. There should be always two, to make a proper relief. It is a great pity that so much money is expended to have wise doctors, and so little is given for good nurses, when these are the actual agents of his will, and are always chosen from a class most prone to counteract him.

† See Par. CCLXXXII. of the Elements. Vol. II.

‡ See Par. CXVII.

|| See XXXVII.

adequate to the cure of the small pox*, or prevents the violence of that disease, if it is the best remedy for catarrh†. and, when heat is avoided, of the greatest efficacy in every sthenic disease; it is not to be doubted, but that it is of the greatest benefit in diseases of the highest sthenic diathesis.

Its operation in the small-pox, and in other sthenic diseases, is not different, but altogether the same. Nay, in all the diseases of this form, cold is productive of the highest good, especially when the sthenic diathesis, as is the case in the diseases that are our present subject, rises to its greatest height, and demands instant relief; because, in that case, every moment's delay brings instant danger; though the remedies, which we have mentioned, are sufficient for the solution of the disease, of which we have direct proof in practice; though that degree of cold, which would produce the effect, is neither always within our reach, nor can be properly applied by every person; and many persons might not be disposed to believe its effects so beneficial: yet we should not desist from the plan of cure here laid down‡, but do our best for the patient, by taking off the blankets, and other clothes, by cooling the room, and, instead of laying him on a couch or bed, putting him into a chair. This indeed should, for the most part, be as the cold bath, on another account; for the shortness of the time in which any one could possibly remain in intense cold, would oblige him immediately to return to a higher temperature, which would produce a greater excitement than he had been under before his exposure, at least too great an excitement§.

* See Par. CXXI.

† See par. CCCCVII.

‡ From CCCCLIV. to CCCCLXV.

§ See Par. XXVI.

After the application of intense cold, the application of heat must be studiously avoided, because its operation, from the increase of the excitability by cold, becomes more effective. And the consequence is more to be dreaded, because, at the same time, other stimuli are usually applied.

Cold is then the beneficial temperature in the cure of the sthenic diathesis, but it must not be followed by any considerable degree of heat. The mistake, therefore, in medical practice, of thinking cold hurtful in sthenic diathesis by a stimulant operation, should be corrected: its use in the small-pox is not to be understood to arise so much from its mere debilitating degree, as from avoiding the stimulus of heat after its operation. When the same precaution is employed, cold either alone, or in conjunction with other debilitating powers, has lately been found the most effectual remedy for catarrh, or for *a cold*, as it is vulgarly called.

From which circumstance, and because a cap of fresh earth put upon the head, has been of service in phrenitis; and because that degree of cold, which attends frost and snow, when applied to the naked body, has removed a synocha accompanied with delirium*; and because cold is

* Such a disease is called, says Brown, the common inflammatory fever, very improperly, as being no fever, but a general pyrexia, or affection of the whole system, without inflammation or local affection. Its proper generic name is pyrexia. See Elements, par. LXVIII. where that appellation is assigned to it. Great mischief has been occasioned by vague terms. Thus when a person is said to be affected with a disease; when it is asked what disease it is, and the answer given, that it is a fever, immediately bleeding is thought of, though that, and every, evacuation is as hurtful in putrid fever as it may be serviceable in the pyrexia. There has nothing done greater injury to medicine than this bad classification of diseases. In Ireland an apothecary coming to die, the widow taking a liking to the boy who carried his late master's horse, married the boy,

so efficacious a remedy in the small-pox ; it clearly follows, that the use of cold should be extended to the whole range of predisposition and the whole circle of diseases, depending upon sthenic diathesis.

The effect, therefore, falsely imputed to cold, of occasioning the striking in of the measles, is not to be imputed to cold alone, but to heat and other stimuli ; giving, as has been explained, more excitement*, than if cold had not preceded. And how can it be otherwise ? If cold does not interrupt the eruption in the small-pox ; but, on the contrary, by an enlargement of the diameters of the perspiratory vessels, which are shut up by sthenic

and he was immediately put into possession of the *Edinburgh Pharmacopœia Pauperum*, and alphabetically arranged he found *fevers*, and the remedies good for them, *sore eyes*, and the remedies for them, and so forth, and plucking out his remedies from a cabinet thus labelled and furnished, he became a famous doctor, for such *as lived he cured*, and those *who died, nature killed*. In all pyrexias, where the patient is uneasy with the weight of clothes, have shook them off, and courageously exposed themselves to cold, and drank freely of cold water, instead of death, recovery, contrary to the prognostic of the physician, has ensued. From which, and a prodigious number of facts to the same purpose, all concurring in the proof of the debilitating operation of cold, there can hardly arise a doubt in the mind, that in a certain high degree, if it could be conveniently used, or if there were occasion to have recourse to it for want of efficacious remedies, it would at once remove the highest degree of sthenic state that ever occurs in disease, and reduce the excitement from the nearest approach to 70 down to 40. Nay, it might run into the opposite extreme, and go all the way to death. But we shall, by and bye, have occasion to observe, that we are so well provided with effectual remedies as not to be under any temptation of straining this to its height. And we shall also find that a number of remedies in a moderate degree are preferable to any one, or to a smaller number in a higher degree. The discovery of the principle upon which the cure of sthenic diseases turns, has enabled us to render the cure both more complete and exact, than it could have been without principle.

* See XXVII. and the addition, and CCCLXXX.

diathesis, much promotes the discharge of the matter* : why, in a perfectly similar case, should its operation be supposed different, not to say, diametrically opposite? Must we again have the trouble to refute the false notion that *a cause precisely the same may produce contrary effects*? Cold diminishes the eruption in the small-pox: it makes the eruption disappear in the measles. What then? Take a nearer view of the fact: is its effect in both these cases to be supposed the same, or different? How do you know, that the matter, which has disappeared, is driven into the interior parts? What proof will you bring? Confess the truth: and be candid enough to acknowledge, that this is another relic of the alexipharmic doctrine, according to which, the stimulus of heat as well as other stimuli promotes, and cold impedes perspiration. After a great man had shewn the error of that doctrine, both in the small-pox and other diseases†, because he did not carry the application so far as the measles, neither has any one of his followers, who never could step a nail's breadth beyond his words. But it might have been observed, if observation had been any part of their employment, that the measles was a sthenic disease as well as the small-pox. Are not all the successful remedies in both of the debilitating kind? And as it was manifest, that in the small-pox also cold debilitated, or, in the common language, acted as a sedative; might not some suspicion from that very circumstance, have arisen in their minds, that cold, in the measles, does not stimulate, or act as an astringent, and repel the eruption, but produces the same

* See CCCLXXVI.

† In peripneumony he took his patients out of bed, and set them in a chair, for the sake of cooling them, and avoiding the hurtful effect of heat.

effect as in the small-pox? Is it, to such a degree, up-hill work, to use one's own understanding, that a great part of mankind, even those who take upon them the business of teaching and taking the lead of others, in no case ever thinking of exercising a moment's reflection?—But, it may be contended, that the action of cold is in this case peculiar, because, after the eruption, which it is supposed to check, has disappeared, all the symptoms increase in violence. Consider what that circumstance makes for your argument, or whether it makes any thing for you, and not absolutely against you? Was the action of cold followed by that of stimulant or debilitating powers? If it was by the former, the cause of the mischief must be imputed to them; which, as has been just said, produce excessive excitement after a previous application of cold, and more than without it; if debilitating powers had been applied, then there would be room for suspicion, that cold had a concern in the effect. But it is not so: and, in every case, in which the action of cold has been followed by sthenic diathesis, the true cause was not sufficiently guarding against the stimulus of heat, as well as that of other noxious powers. This is clearly proved by the application of heat being positively ordered, instead of being forbidden, in the common practice. Nor is that to be wondered at; for, if the cause of catarrh* deceived physicians so much, the catarrhal symptoms in the measles could not fail to deceive them. And, if doctrines, discarded in words, are often observed in practice; what was there to hinder this part of the alexipharmic doctrine from meeting with this fate?

If cold, therefore, can scarce be so managed, that the

* See from CCCCVII to CCCCXII.

effect occasioned by the accompaniment, the succession, or the alternation, of stimulants, can be prevented, whether that be the fault of the physician, or owing to the nature of the thing* ; it is, notwithstanding, a rule in common to the measles, and other diseases of the same stamp, to avoid heat, and to compensate for the degree by the greater duration of cold, and to guard, with all possible care, against every stimulant power. It is now then most evident that the opinion of cold being peculiarly hurtful in the measles, both in that and every other disease of the same form, falls to the ground‡.

Dr. Brown, in confirmation of this doctrine, gives us a very remarkable case of a person labouring under fever, who, living in the old town of Edinburgh, escaped the vigilance of his nurse ; flew naked out of the house, in a very keen frost, with snow upon the ground, across the streets, passed over into the new town, and from that to the fields beyond it. He soon became sensible of his state, stole into a house next to him, got some clothes thrown about him, and was carried home in a chair, perfectly cured of his disease.

Every exertion of the mind and body should be prohibited. No good news, on any account, should be suffered to be related. With regard to terror, on telling the patient he will not recover, it is dangerous. But the mind, nevertheless, ought to be kept in some suspense.

In order to facilitate the operation of all these various means of allaying intenseness of motion in the vascular system, we are to keep the patients on such a course of diet as shall be perfectly light, and not at all irritating.

* Turn back to CCCCLXV. and CCCCLXVI.

‡ Dr. Brown.

In most of the species of sthenic diseases there is, a loss of appetite, which is an essential symptom ; it is therefore a superfluous caution to say, that in these cases we are not to allow the patients solid flesh-meat or broths, because they naturally nauseate, and refuse such food, and the things that people chiefly relish at these times are those which are most proper, namely, subacid and watery drinks, or at most thin gruel, or panada acidulated.

In Ireland, the patients, in all febrile diseases, generally use a kind of drink which seems almost peculiar to this country, and which is extremely grateful, and well adapted to cool and quench thirst ; it is whey, made of sour butter-milk and new milk, boiled up together ; hence called Two-milk Whey.

In the commencement of inflammatory diseases, and while the pulse continues full and strong, this is the drink which is most in use, and it appears to answer remarkably well: but in places where this two-milk whey cannot be procured, almond milk, barley-water, sage-tea, decoction of the roots of couch-grass ; hot water poured on currant jelly, or on sliced apples, and lemonade, are in their turns to be given to the sick person ; and if there be any appetite for somewhat more substantial, barley or oatengruel, panada, roasted apples, currant jelly, or such light nourishment, is to be given, in such quantities, and at such intervals, as the patients shall desire, and the particular circumstances of the case may suggest.

But in some purely inflammatory cases, there is sometimes no great degree of sickness, and the patients have a desire for taking more solid food than is proper ; but in such cases, it will be the business of those who have the care of the sick person to see that he does not touch solid flesh-meat, or even broth, so long as the intenseness of

motion in the vascular system shall continue so great as to give sufficient reason to apprehend any danger.

We should not only enjoin what is to eat, but the patient should always be required to abstain from every sort of food but vegetable, as well as from all strong liquors, and indeed, one might say, from all but watery liquors acidulated. This direction does not seem to have been so much neglected in words by former writers and authors, as in the actual application to practice; it having been delivered slightly, by the bye, and as if it had been thought of no consequence, so that it made no impression upon the mind of the reader or hearer. No stimulus is more powerful, and, therefore, in this part of the practice, more hurtful, than that of the articles of diet; consequently, whatever quantity of blood is taken from the vessels, whatever quantity of serous fluid is carried off by the mouth and anus, if this stimulus is not effectually guarded against, the effect of all this evacuation may easily be counteracted by improper diet.

SECT. LXXXVII.

Sweating.

The terms sudorific* and diaphoretic† are, for the most part, used indiscriminately ; for all those things that are supposed to have the power of promoting and increasing the cutaneous discharges ; but, strictly speaking, sudorifics mean such things as raise plentiful sweat, while diaphoretics do little more than increase the insensible perspiration.

Neither sudorifics nor diaphoretics are by any means so certain in their operation as emetics or cathartics ; for, whereas, we can almost certainly assure ourselves, that vomiting or purging will ensue after taking any of the different medicines which have been already mentioned, yet we never can be certain that a sweat will break out in consequence of giving any of the things termed sudorifics. From this great uncertainty concerning their operation, it happens that things of opposite sensible qualities shall occasionally become sudorifics ; for, in order to raise a sweat, the medicine must not only increase the circulating force of the fluids, but also have power to take off spasmodic constriction. Hence all stimulating things that have power to irritate the heart and increase the blood's progressive motion, will prove sudorifics ; if, at the same time, the cutaneous pores shall happen not to be preternaturally constricted ; and, on the other hand, all very cooling and sedative things, whose power consists in causing an extraordinary relaxation of the cutaneous pores, may occasionally

* From sudor, sweat.

† From διαφερειν, to carry through.

raise a sweat. Thus, drinking fermented liquors or whey, taking some of the volatile alkaline salts, or other acrid stimulants, will, at certain times, prove sudorific; and thus, drinking of cold water, or taking a large dose of nitre, will, at other times, excite the cutaneous discharge.

From this we may easily infer how little dependence is to be had on the sudorific virtues, which are ascribed to a multitude of things by writers on the *Materia Medica*.

Since, in order to raise a sweat, either the force of the circulating fluids must be so far increased as to overcome the resistance in the extremities of the cutaneous arteries, or their orifices, which open the surface of the body, must be so far relaxed, that their resistance shall not be equal to the force exerted by the heart; the most certain way of promoting this discharge is, to apply such things to the surface of the body as shall relax and set open the cutaneous pores. Nothing can do this more effectually than warm vapour; and therefore a stove or vapour-bath is the most certain way of raising a plentiful sweat, which may be increased to a very high degree; if, at the same time that the vapour is applied to relax the pores at the circumference of the vascular system, some stimulating drink be plentifully administered to increase the power of the heart, and cause a greater force to be exerted from the centre. I know not that this has ever been applied in thoracic inflammation.

The most powerful, as well as most certain internal sudorifics, are combinations of antimonials, or ipecacuanha, with opium; the latter is termed *Dover's Powder*, and is sometimes used with success in cases of inveterate rheumatism.

R Pulv. Ipecac. comp. gr. 10.

Horâ somni sumend.

That is, take of

Dover's powder—ten grains, going to bed.

Or, Antim. tart. gr. $\frac{1}{2}$.

Pulv. cornu ust. cum opio. gr. 5.

M. F. pulv. horâ somni sumend. superbibend.
seri lactis tepid. lb. $\frac{1}{2}$.

That is, take of

Tartarized antimony—half a grain.

Opium powder, with hart's-horn—five grains.

For a powder to be taken at bed time, drinking
after it half a pint of milk whey, made with
vinegar or wine.

Or the following :

Potas. subcarbonat. sc. 1.

Suc. limm. recent. unc. $\frac{1}{2}$.

Aq. font. unc. $2\frac{1}{2}$.

Syr. simp. dr. 1.

Tinc. opii, gtt. 12.

Liq. antim. tart. gt. 30.

F. Haustus h. s. sumend.

That is, take of

Prepared kali—a scruple.

Lemon juice—half an ounce.

Water—two ounces and a half.

Simple syrup—two drachms.

Tincture of opium—twelve drops.

Antimonial wine—thirty drops.

Make into a draught to be taken at bed time.

Addere liceat tinc. scill. gt. 30.

Vel potas. sulphat. gr. 10.

F. Haustus ter in die repet.

It is proper sometimes to add, when the lungs are oppressed, thirty drops of tincture of squills; or, to keep the body soluble, ten grains of vitriolated kali, and the draught then to be taken three times a day.

The use of diaphoretics in febrile diseases, must depend on such a number of nice circumstances that no general directions can be given: only this caution seems necessary, that so long as the spasmodic constriction is found to continue, we are never to give any of those things mentioned in the books under the titles of Diaphoretics, Febrifuges, or Alexipharmics; for all these, unless the constriction has already given way, will only add to the distress by augmenting the heat, and increasing the disturbance in the vascular system. But when signs of this relaxation appear, then we may assist the power of the heart, by giving wine whey, or some of the pharmaceutical diaphoretics.

Dr. Brown was a great stickler for sudorifics. He endeavoured to confute the objections against them thus. Some, says he, may say that the heat, which accompanies the first part of the operation of sweating, may be hurtful; for, as he never made trial of it, he has it not in his power to say, that for certain it will be hurtful. This is readily admitted in an high diathesis, threatening indirect debility; but it cannot also be granted, that in a moderate degree of the diathesis, either original, or effected by other remedies, and, consequently, after the plan of treatment, that we have laid down, has been executed, such heat will not be compensated by the great profusion of fluids taken away

from the whole surface of the body; or that, when this part of the vascular system has been freed from a violent stimulus, the diminution of excitement will not be more equal in all the vessels, and over the whole nervous system. If the numerous vessels, that open into the intestines and into the stomach, afford such an opportunity to diminish sthenic diathesis, how is it possible that a similar evacuation in the similar perspiratory vessels should have no tendency to produce the same effect? To which reasoning, if the facts just related, be added, what can any person have to say against the use of sweating, if a degree of heat, not greater than what cannot be avoided in the operation, can no longer be hurtful, and if the sweating itself is certain to be of great service*? Let the spasmodic caviller against the use of that remedy in the cases of sthenic affection where it is admissible, muster up all his facts and all his theories, let him turn himself into all shapes, he will never produce a solid argument against this remedy. But what, again, is the tendency of all this disputation? Will there never be an end of running from one extreme of error into the opposite? Shall no mean be found betwixt the alexipharmic plan of cure, and one equally bad or worse? If that doctrine hesitated not to prescribe sweating in the rage of a peripneumony, and that too procured by means of the most heating stimulant powers; does it therefore follow, that a plan of treatment

* In an excitement of sixty-seven, within three degrees of indirect debility, the heat in the first part of the sweat, by adding these, might kill the patient, if you will, without leaving any chance of relief from its evacuant effect. But if the excitement be no higher than 60°, the addition of the three degrees will keep greatly within the point of indirect debility, and, therefore, be safe; while the succeeding evacuation may reduce the excitement perhaps 10°, and bring it within the range of predisposition; and a new course, or a little prolongation of this, carry it down to the point of health, and finish the cure.—*Brown.*

must be admitted, which rejects the certain and safe use of this remedy, when excited by the most gentle means* ? If it was the opinion of Dr. Sydenham, that heat should be avoided in the cure of sthenic diseases, which was quite right, as heat certainly increases the excitement ; are we, for that reason, to avoid that tolerable degree of heat, which accompanies a remedy the most powerful in restoring the healthy state, and thereby deprive ourselves of great benefit upon the whole ? If such persons do not know, that several remedies diminish excitement more powerfully than one ; and if they are to be excused for their ignorance ; are they also to be excused for not seeing, what any empiric might have seen, that some things are of service, and others of disservice ; is such want—not of genius, for genius is not required of them—but of common sense also, to be pardoned ? If to think for themselves, and to make any sort of discovery, was too much to be expected from them † ; is it not somewhat surprising, that out of a thousand writers, who have treated of every part of medicine, and entertained different sentiments from one

* Brown's practice was, when the signs of a spontaneous sweat are perceived, nothing more is to be done, but first to lay the clothes about the patient, remove the sheets, put the blankets next to his body, guard against the approach of air, and keep up the discharge for a sufficient length of time, at least ten or twelve hours. If from this management there shall ensue a copious and universal flow of sweat, there will be no occasion for giving medicine for the purpose. After sweating has increased the relief formerly procured ; if it should disappear towards the end, it should at last be supported by Dover's powder (*pulv. ipecac. comp.*) or by laudanum alone ; at the same time the body should be covered, so that it may get as quickly as possible to the surface, till the expected benefit be obtained.

† The reader is referred to what is said, when treating of catarrh, where we gave our reason for dissenting from Dr. Brown.

another, they could squeeze no information, but always trod in the footsteps of one single man‡?

S E C T. LXXXVIII.

How the Remedies should be varied.

'The error of physicians in general is, that they have a great reliance on bleeding. It was to the honour of the great Dr. Brown, first to notice this dangerous error, and I feel the more pleasure in stating his *practical* improvements in medicine, as they are so little understood even by those who profess themselves to be *Brunonians*.

As the noxious powers, that produce predisposition to diseases, or diseases themselves, act some on one part, some on another, with somewhat more force than on any other equal part; and as this part is commonly that to which they are directly applied; so the powers, which are employed as remedies, in order that their general effect may reach the whole body with the more certainty, should be, in the same manner, differently applied to different parts.

The action of every exciting power, whether salutary or hurtful, or curative, always extends over the whole body, the whole seat of excitability, but still with the inequality mentioned in the fourth chapter of part the first. This is the basis of the distinction with respect to the present subject; which is, that, as every power acts most effectually on the part where its action is immediately exerted, it is better to trust to a number, every one of which pos-

‡ Such are the expressions of Dr. Brown, who always shewed a hearty contempt for the faculty, who had so very illiberally opposed his doctrines!

sesses that advantage, than rely on *any one remedy*, however powerful otherwise ; as by that means, whatever be the indication, whether it be to increase or diminish excitement, the effect will be more equally produced over all, in consequence of there being a number of parts that have had a strong action exerted upon them.

The cure, therefore, of any sthenic disease whatever, is improperly entrusted to bleeding alone, though that is one of the most powerful of the debilitating remedies. The reason is, that, though the excitability is sufficiently reduced by that remedy in the greater blood-vessels, perhaps too much, yet in the extremities of these, as well as in the rest of the body, it is not sufficiently reduced. Nor is the alteration of bleeding with purging a perfect mode of cure* ; because, though the excessive excitement be sufficiently, and more than sufficiently, removed in the greater blood-vessels, and in the innumerable small arteries, whether exhalant or mucous, which discharge their fluid into the intestines ; yet, neither on the perspiratory terminations of the arteries, nor on the rest of the body, is an equal debilitating energy exerted ; the small vessels, for instance, which open into the stomach, are not sufficiently relieved of their distending load, and therefore stimulating load, the stimulus in any vessel being the quantity of its fluid. And although vomiting† should be conjoined with the two remedies just mentioned, even this would not be enough to produce an equally diminished excitement ; as there would still remain in the perspiratory vessels the same state of excitement, as also in the rest of the body, that is not vascular. In vio-

* This was Sydenham's practice.

† Bleeding should come first, in the evening ; then purging, the next morning ; then vomiting ; perhaps bleeding again, or more mild cathartics, or sudorifics.

lent sthenic diseases, therefore, after diminishing the diathesis, and in the slighter from the beginning of the disease, the addition of the operation of sweating to the evacuations that have been spoken of, will produce a more equal diminution of excitement, and a more perfect solution of the disease. For by means of this evacuation, not only from the larger blood-vessels, in the interior parts of the body, but from an infinity of outlets, both of the external and internal surface of the body, an immense quantity of fluids, every where distending, and thereby producing a very great sum of excitement, is withdrawn. Nor is this all. For, since in slight sthenic affections, the patient can take much nourishing food, and in them all, too much; the consequence must be, that, however the quantity of blood and other fluids has been diminished, if food, which is the only power that can produce blood, continues to be taken, all the vessels in proportion to the quantity that has been taken, will again go on to be filled, and to be fired with the fuel of excessive excitement. To prevent this inconvenience, and to diminish excitement, with still greater equality over the system; abstinence, or a certain allowance of vegetable matter in a fluid form, and watery drink, will have a very great effect. Nor is this sufficient. For if, after taking all the precautions and securities that have been recommended, the degree of heat, that proves hurtful from its stimulus, be allowed to approach the external surface of the body; it will produce another inequality of excitement, however much it may have been properly and equally diminished by the other means of cure. Wherefore, as the sthenic diathesis depends so much upon the stimulus of heat, directly affecting the skin, and, is, on that account, prevalent in the skin in preference to other parts; to make sure of rendering the diminution of excitement as equal as possible, the debili-

tating effect of cold should be opposed to the high degree of excitement, which the heat has produced. When, at last, all the directions, which have been thus fully pointed out, have been executed, still, to re-produce the equality of excitement, suited to good health: it remains, that we be on our guard against the stimuli that arise from the intellectual functions and passions. For, as they have great effect in producing sthenic diathesis, so the prevention of them must be equally effectual in removing that diathesis, and in re-producing that equality of excitement, upon which health depends*.

If the cure of sthenic diseases hitherto has consisted in bleeding, purging, and in the use of refrigeration in a few cases; and, if the other objects, which have now been so fully explained, have either been totally neglected, or mentioned in a slight way, by the bye, and as if of no consequence, and, in the treatment prescribed in these cases, not reduced to any principle; it will easily appear, from what has been said above, and in other parts of this work, how much the knowledge of these diseases has been *improved*, both in the practical and reasoning part; and it will now, at last, be found a certain and established fact, that both the nature and true theory of sthenic diseases, as well as the method of treatment, considered either as an art and imitative, or as rational and scientific, has been discovered and demonstrated†.

* As the most healthy state of man is occasioned not by the operation of any *one* or of a *few exciting powers*, but by the *united operation of them all*; so neither is its re-establishment to be effected, but by the same united operation of all the remedies, the last of which come to be the ordinary means of the support of the healthy state.—*Brown*.

† This is taken verbatim from Brown's Elements of Medicine, being his eleventh chapter, and deserves every attention of the practitioner.

SEDATIVE POISONS.

SECT. LXXXIX.

Sedative-Poisons.

In considering sedatives according to their effects, may they not be naturally divided into two kinds, viz. *Direct and Indirect*?

By a *Direct Sedative*, I mean a medicine which operates more or less immediately as a sedative, without producing any stimulating effects; such as the cicuta, hydrogen air, and perhaps many other substances.

By an *Indirect Sedative*, I mean a medicine which, although it ultimately produces sedative effects, yet has some other previous stimulating operation; such as opium, &c.

Now, although opium has generally been ranked as the chief of the sedantia, yet its stimulating power is at present very well ascertained: and every practitioner knows (what we have already mentioned), that, if applied to the eye, or to a tender surface, it will produce more or less of irritation and pain, whatever ultimate sedative effects it may occasion. From this stimulating property, which is always more or less discoverable on its first exhibition, are we prevented from employing it in cases of strong active inflammation? For, in them, if opium is given alone, the phlogistic diathesis of the system is in

general thereby increased, and the disease thus rendered more difficult of cure.

But this is probably not the case with some other substances, the subject of our present consideration, or if they are directly stimulant, and indirectly stimulant, that is, first produce a stimulant effect, this first stage is of so short a duration, that they may well rank as *direct* sedative powers, contrary to the sentiments of some Brunonians.

The cicuta, if applied to the most irritable surface, or even injected into the cavity of the chest itself, produces no pain; on the contrary, it will immediately relieve it, shewing its direct sedative power. No exhilaration is perceived; on the contrary, always a distress of the system, and a diminution of both mental and bodily powers. If the head is affected, the images presented to the imagination are frightful, vertigo and sickness are produced, and often violent convulsions. Indeed the direct and quick sedative effects of the class of poisons we are considering have made them be esteemed as narcotic, or stupifying; and the very terror of their name has hindered them from being employed, except in diseases where all other means have failed. But let it be remembered, that the virtue of any drug is only relative, and that poisons are either good or evil according as they are applied; for direct powers which are capable of suspending all the actions of the body, even of the heart and brain itself, are surely capable of restraining inordinate action, and therefore, of being applicable to the large and dangerous class of sthenic, or acute diseases.

Our first consideration will be that of the cicuta. There have already appeared three separate publications from Dr. Stork of Vienna on this subject; but his cases will help us very little in the present view of our subject.

They at any rate shew, that these sedative poisons, blunting the sensibility of the nerves, mitigate the pain of excruciating sores*, and they may have done some service in epilepsy and mania. But we are to consider their use in sthenic diseases.

The following is one among the many cures performed in this way by Dr. Thornton.

Samuel Parker, coachman to Mr. Mills, Lincoln's Inn, was wet through driving his master, and the next day felt a violent pain in the right side, and could not fetch his breath without great pain, breathing extremely difficult, and cough severe; he was so ill, that every one despaired

* The formula is,

R. Cicut. herb. exsiccat.

Chamæm. flor. sing. unc. 1.

Aq. fervent. lb. 1.

Coque per sextam horæ partem, et liquori expresso, adde

Farin. sen. semin. q. s.

Ut fiat cataplasma.

Parti dolenti calidum, et pauxillo olei olivæ illinitum, applicetur,
et renovetur his die.

That is, take of

The dry stalks of cicuta,

Chamomile flowers, of each an ounce.

Boiling water a pint.

Boil during ten minutes, and to the liquor, passed through a bag, add

The meal of linseed,

As much as is sufficient.

Apply this warm to the painful part, first spreading over it a little olive oil, and renew this twice a day.

of his recovery. He was ordered an emetic, to be taken in such small quantity at a time, as to create considerable nausea, and the following day he was to pursue the following directions :

R. Suc. cicut. spis. gr. 3.

Pulv. trag. comp. dr. 2.

Simul terantur, et in portiones sex equales dividantur; quarum sumat unam primo mane, horâ xi. matutin. et horâ somni sing. diebus.

That is, take of,

The inspissated juice of hemlock—three grains,
Compound powder of tragacanth—two drachms.

Let them be rubbed together, and divided into six equal parts, of which let one be taken early in the morning, another at eleven in the morning, and at bed time every day,—Or,

R. Suc. cicut. spissat. dr. 1.

Herb. cicut. exsiccat. in pulv. trit. q. s.

F. pil. 30. quarum cap. duo. dein plures, aucto illarum pro re nata numero, sing. dieb.

That is, take of,

The inspissated juice of hemlock—one drachm.

The dried powder of cicuta—as much as is sufficient.

Make into thirty pills, of which take every day two, afterwards more, increasing their quantity, as the occasion may require.

In other cures of peripneumony, a pill of the powder of digitalis, of which one grain has been given night

and morning, and the cicuta at eleven and seven in the day.

As other narcotic poisons may be found hereafter to merit attention, we will conclude with some formulæ, which should be very cautiously tried.

R Suc. spissat. aconit, gr. 1.

Glycyrh. pulv. gr. 2.

Cons. cynosb. q. s.

F. pilula, bis terve in dies sumend.

That is, take of

The inspissated juice of aconite—one grain.

Liquorice powder—two grains.

Conserve of hips—as much as is sufficient. To make into a pill, to be taken twice or thrice a day.

R. Belladon. folior. exsicc. dr. $\frac{1}{2}$.

Aq. servent. unc. 12.

Macera per quadrant, part. hor. in vase operto, er liquorem cola; et cap. coch. larg. duo ter in die.

That is, take of

The dried leaves of belladonna—half a drachm.

Boiling water—twelve ounces.

Digest in a covered vessel for a quarter of an hour, and then strain off the liquor. Take two large table spoons-ful three times a day.

SECT. XC.

Of the Utility of Popular Instructions, with an Exhortation to Physicians.

Having now finished with the general mode of treating cases of sthenic disease, we would exhort the patient to an early application to the medical practitioner, and to the practitioner an energetic practice suited to the occasion.

The friends of the patient (especially nurses) may object to the violence of the measures advised, but the practitioner must be steady in his resolution, convinced that he has a most sacred duty to perform. It may be right for him to confess, that his measures may seem cruel, that medicine was not designed for us in health, but that it resembles the operations of surgery, which are ever consented to for the sake of life; and that to complain of purging, vomiting, bleeding, and blistering, as hard treatment, is as ridiculous as a person in the water in the act of drowning, refusing a rope, because it is rough and dirty, or calling out, that the person who is saving him takes him by the hair, and hurts him. The danger is serious, and the imperious voice of duty forbids all mean compliances.

We would next exhort the patient not only to an early application to the medical practitioner, but also to make a good choice in his physician. For the disease he labours under admits of no parly; a mistake here cannot be afterwards rectified, and must terminate in death, or a state ten times worse than death. Even lay-persons educated in the principles of the science (unless the

necessity is great) should be distrusted. Medicine is not a speculative science only ; but also an active and practical art, the proper exercise of which can be attained only by long experience. This is allowed to be the case in all the other practical arts, and the education in them is conducted accordingly. Let us suppose of a young man designed to be a sailor, that for the first years of his education he studies mathematics, natural philosophy, and navigation, but has never been at sea ; when he makes his appearance there, what must be his situation ? He can talk of mechanical powers, of friction, of the nature of magnetical effluvia, of the theory of the winds, and, in short, shew himself master of every branch of his profession, so far as speculation could carry him. But can he handle a rope ? can he go aloft and furl the sails ? can he make an observation in a rolling sea ? can he do any one useful work aboard the ship, or direct the sailors how to navigate her in a storm ? Who would trust himself to the direction of such a sea commander ?—The case is much the same with the lovers of our art, who have had what is called good instruction, and are well grounded in every branch of our profession except the practice ; in which they must be defective, if they have not for some years diligently attended the sick. So I doubt whether even Sir Isaac Newton would have supplanted the simple steersman of a ship.

The knowledge acquired from this work, however, will enable him to know the merits of his physician, and make him readily acquiesce in his injunctions, and this is a matter of no small importance. For the state of our profession is singular. A common artificer has no other way of rendering himself eminent in his trade, but by excelling in it. Of this, all mankind are judges. If he is a bad workman, no address or qualifications of any

other kind can avail him. No gentleman can hope to rise in the profession of the law, who does not possess the abilities of a lawyer. The proofs of his knowledge, ingenuity, and eloquence, are daily exhibited to the world, and their value is duly ascertained. In short, every man's merit, in his profession, may be well known to the public; and is in general suitably rewarded. But the case is not so here, an imposing garb may make the flock mistake the wolf for the lamb, and I would wish every one to be shepherds upon so trying an occasion.

The objection then of laying medicine open to the world like other sciences, from its tendency to multiply bad practitioners, and to lessen the authority of the physician, is not well founded. It is not possible to confine the practice entirely to regular physicians. Cases are continually occurring of people labouring under diseases, who can have no access to the assistance of the faculty. It would be barbarous to hinder those from using such remedies as appeared to them most likely to afford them relief; or to prohibit a friend or a by stander from giving their assistance in such a situation. In fact, as every person prescribes occasionally, the only question is, whether they should receive any assistance from art, or be left to act as their fancy may lead them. If, by withholding this assistance, every disease, where a physician was not consulted, was to be left to Nature alone, physicians would have a plausible excuse for keeping the world in ignorance; because it might be alledged, that more diseases would be cured by the efforts of unassisted Nature, than by the random management of people imperfectly instructed in medicine. But, in reality, this is never the case in diseases of any consequence. I shall give an example, in the general treatment of fevers among the lower class of people, when they are deprived of medical assistance.—The

unhappy patients are generally confined to a close room, where they breathe a hot and putrid air ; every method is tried to raise a sweat ; they are loaded with bed clothes ; sometimes they are made to drink spiced and strong liquors ; at other times large quantities of warm water gruel, although their stomach loathe it, and it occasion flatulence, sickness, and oppression. If, in consequence of great heat or delirium, they attempt to get out of bed, they are confined to it by force ; nor are they suffered to change their bed or body-linen, till the fever is quiet removed ; by which means the air becoming more putrid, aggravates the symptoms, and makes the disease contagious.—In such cases, because the patients have no physician, and take no medicine, the disease is said to be left to Nature. But this is a mistake. If such patients had been really left to Nature, they would have been treated very differently. They would have been indulged in whatever was agreeable to them ; they would have breathed cool and fresh air ; they would not have been teased to eat or drink beyond what their appetite demanded ; they would have been indulged with cold water or small beer in what quantity they pleased ; they would have been suffered to get out of bed and to enjoy the cold air, or to have had few bed-clothes, with liberty to throw out their limbs without controul ; their linen would have been changed daily, and every thing kept clean and sweet about them. Similar instances might be produced from other diseases. Patients are so far from being left to Nature, when no physician is called, that they are commonly oppressed with a succession of infallible cures recommended by quacks, or by their weak and officious friends.

Learned physicians, then, have nothing to fear from the intrusion of men of science who have turned their

attention to medicine. Such will be modest in proportion to their knowledge of the subject, and will be the readiest to call for the assistance of a physician of experience and abilities, to respect his judgment, and to enforce his prescriptions; while, at the same time, they may suggest what may be useful to the ablest of the profession.

If we consider the situation of a young physician of genius, brought forward and supported in his profession under the honourable patronage of those who are judges of that genius; and that of another destitute of such assistance, and compelled by necessity to attend to the prejudices, and to humour the caprices of the ignorant and impertinent intruders into his office; how pleasant, how creditable is the one? How humiliating the other, to every man of spirit and sensibility?

I have thus endeavoured to shew that, by laying medicine open, and encouraging men of science and abilities, who do not belong to the profession, to study it, the interests of humanity would be promoted, the science would be advanced, its dignity more effectually supported, and success more certainly secured to each physician, in proportion to his real merit.

Before I conclude, I cannot help observing, that such objections as are made against any person pretending to judge of medical subjects, who has not been regularly bred to the profession, were formerly urged against the reformers from popery. Besides the divine authority claimed by the church, it was said, that a set of men, who devoted their whole time and studies to so deep and complicated a subject as theology, were the only proper judges of whatever belonged to it; that calling their authority in question, was hurting the cause of religion, and lowering the sacerdotal character. Yet experience has shewn, that since the laity have asserted their right

of inquiry into these subjects, theology, considered as a science, has been improved ; the real interests of religion have been promoted ; and the clergy have become a more learned, a more useful, and even a more respectable body of men, than they ever were in the days of their greatest power and splendour.

CURE OF ASTHENIC DISEASES.

SECT. XCI.

Although the body be made up of separate parts, each performing distinct functions, as the brain, stomach, liver, kidneys, blood-vessels, absorbents, &c. yet are they each to be considered as living bodies, subject each to the same diseased action, which was either too great, or deficient. As in a complete machinery, some parts are weaker than others, and subject to peculiar disease, though referable to the same class. Thus a weakened action of the *brain* produces palsy, mania, and epilepsy ; of the *lungs*, pituitous cough or asthma ; of the heart, palpitation, hypochondriasis, convulsions ; of the *diaphragm*, spasmodic asthma ; of the *stomach*, dyspepsia, sick-headache, diabetes, and night-mare ; of the *bowels*, colic, diarrhœa, spasms, convulsions ; of the *kidneys*, a pale flux of urine ; of the *absorbents*, the sundry kinds of dropsy ; of the *blood-vessels*, hemorrhagies, &c. &c.—Thus the fountain head of all these diseases is *debility*, either general or local, and hence each has been cured by the same remedy, although some remedies experience may have shewn more applicable to one state of disease than the others, as will be pointed out in the subsequent sections.

SECT. XCII.

Bitters.

Bitterness is a simple perception that cannot be defined, but must be referred to a matter of experience in which mankind are commonly agreed. What is the nature of the substances possessed of it in a chemical view we cannot determine, or at least we can only in a negative way distinguish it from other matters.

Thus we can say, that bitterness does not depend upon any volatile parts, for the purest and strongest bitters have no smell; and if there are some bitters which give a smell, that again is commonly lost on drying, while the bitter taste and quality remain entire.

In another view, the bitters are without volatile parts, as the purest kinds of them give out in distillation no essential oil; or if some of them do, the oils are without bitterness, and show very clearly, that the bitterness of the entire substance did not depend upon the essential oil in their composition.

We learn also otherwise, that bitterness does not depend upon any such oil in the composition of their substance, as some of the strongest bitters are quite free from any acrid or aromatic quality.

Neither can I find any thing distinctly saline in the composition of bitters. There are hardly any of them which to our taste discover any saline matter except in a few substances, in which some acid happens to be conjoined; but the strongest bitters are absolutely free from any such quality: and so far are acids from entering into

the composition of the bitter, that we shall hereafter show the combination of acid to have a tendency to destroy the bitter quality. With respect to any other saline matters to be alledged in the composition of bitters, it is true, that, by particular processes, saline matters can be extracted from bitter substances; but as these saline substances are not extracted, but produced by a destruction of the original mixture, and as nobody has shewn that the saline matters are in any certain proportion to the bitterness of the subject, or that they modify it in any certain manner, we cannot make use of any such analysis in explaining the natural composition of bitters.

Upon the whole, I must alledge, that in a chemical view, we cannot explain the nature of bitters. It is a composition *sui generis*, that we can in many cases distinguish from all others; and if in any case we have learned to change its condition, it is from particular experience, and not from any knowledge of its constituent parts.

Before we enter upon what experience has taught in this respect, it will be proper to consider the various purposes in medicine to which bitters may be applied. And as in this view the bitters in their operation on the human body have many of them the same qualities and virtues in common, we think it may be useful to consider, in the first place, what these common qualities are.

First, then, the most obvious operation of bitters is, that being taken into the stomach, they increase the appetite for food, and promote the digestion of it. But we take it for granted, that these functions depend upon the tone of the muscular fibres of the stomach; and therefore may suppose, that the improvement of these functions depends upon an increase of tone in those fibres. And farther, as loss of appetite and indigestion can often be distinctly perceived to occur from a loss of tone in the

stomach ; so bitters, as they are often effectual in curing these disorders, may be presumed to do it by restoring the tone of this organ.

The correcting the acidity and flatulence of the stomach may be ascribed to the power of bitters in checking acedent fermentation, which they do out of the body ; and the relieving the stomach from abundant mucus or phlegm, as it is called, may be ascribed to the power of bitters in dissolving viscid animal fluids. As it is, however, probable that both the prevalence of an acedent fermentation in the stomach, and a superabundance of mucus in it, are commonly owing to a loss of tone ; so the correction of those disorders may be ascribed more properly to the tonic power of bitters, with respect to the human body, than to their chemical qualities.

There is, then, hardly any doubt, that bitters are powerful tonics with respect to the stomach ; and there being as little doubt, that the state of the stomach is commonly communicated to the other parts of the system ; so it is sufficiently probable, that by an improvement of digestion, the vigour of the system may be in general improved ; and that also the tone, and consequently the activity of the whole of the moving fibres may be increased.

Bitters, however, do not act as stimulants, for they do not increase the frequency of the pulse, nor the force of the circulation ; nor do they act as astringents, because they do not always possess any such quality ; and therefore they must in such cases act purely as tonics.

There remains only one operation of bitters internally employed ; and that is their proving anthelmintic, and a poison for worms. There is one instance reported of their even mitigating the pains arising from a *tænia* ; but we do not find any account of their ever expelling that kind of worm. It is said to be the *lumbrici teretes* to which they

are especially adapted; but from Redis's experiments it appears, that bitters are not an immediate poison to those animals*.

* After having thus considered the general virtues of bitters, I am to offer some general remarks with respect to their administration and pharmaceutical treatment.

The medicinal part of bitters of every kind may be extracted by either watery or spirituous menstruums, and such extractions may have the virtues of the substance from which they have been taken; but I maintain, that hardly in any case they ever have in the same degree; and that, wherever it can be admitted, the bitter in substance is the most effectual, and in some cases the only effectual, mode of exhibiting it. This every body knows to be the case with the Peruvian bark: and I have found the same to be the case in all my attempts to substitute other bitters in place of that bark.

There are cases, indeed, in which the stomach will not bear either the bark or bitters in substance, and therefore it becomes often necessary to obtain their virtues in a liquid form; in the management of which, however, several particulars demand attention.

By infusion in water, and even in cold water, bitters give out their virtues; but to cold water they never give a strong impregnation, though it be generally the most agreeable to the palate and stomach. Warm water, though under the boiling heat, extracts more powerfully than cold, and the more as its temperature is warmer. With respect to every temperature, this is especially to be attended to, that by infusion bitters suffer a gradual decomposition, and consequently the matter extracted is different according to the length of time that the menstruum has been applied; so that the temperature being given, what is extracted in the first hour is a lighter and more agreeable matter than what is extracted after many hours' infusion.

This we have tried with several bitters, infusing the same quantities of the bitter in the same quantity of water, and setting all of them in the same degree of heat, for six, for twelve, for twenty-four, and for forty-eight, hours. In every experiment it appeared that the impregnation was stronger according to the length of time employed in infusion, and at the same time that the harshness of the taste was sensibly increased. This, however, was remarked, that the difference of the impregnation was not so remarkable in the longer infusions as in the shorter; and therefore the impregnation did not appear in the forty-eight hours so much in proportion stronger than that of twenty-four hours, or so great as that of twenty-

Having now said what relates to bitters in general, we proceed to examine how far the general virtues prevail in

four compared with that of six. On the other hand, it appeared that the harshness of taste increased according as the infusion was longer, and therefore the harshness of taste was not so much increased from the twenty-four hours above that of six, as it was in the forty-eight hours' infusion above that of twenty-four. From all this we conclude, that an infusion of twenty-four hours is sufficient for impregnation, and that little harshness will be produced by infusions of a shorter time; and therefore a sufficiently useful, and the most agreeable, infusion of bitters in cold water, or even of warm water under the boiling heat, will be that of twenty-four hours, or perhaps less. The London College, in limiting their infusions even of boiling water to a single hour, seem to be more nice than is necessary.

The treatment of bitters by cold infusion in wine, is, with respect to extraction, much on the same footing with the treatment by water. It does not appear that wine extracts the medicinal qualities more powerfully than water, or in any instance gives a more efficacious medicine, excepting where the wine concurs in the intention of it as a medicine. It is, therefore, almost only for the purpose of a more agreeable medicine that bitters are infused in wine.

A still more powerful extraction is made of bitters by a boiling heat; and here also the same difference arises from the length of time employed in decoction. With respect to bitters, it is certain that decoction extracts more powerfully than infusion; but by dissipating any aromatic parts that were joined with the bitter, and by extracting more of the earthly part, and what may be called a coarser bitter, decoctions are always more disagreeable than infusions; and therefore what we call extracts, which are always prepared by decoction, are always less agreeable to the stomach than the bitter in substance. It appears to me that decoction decomposes the substance of what is extracted: for it is seldom that decoctions do not upon cooling deposit a part of what they had suspended before, and that also a matter different from the entire substance. What is exactly the nature of the matter impregnating the decoction, has not been duly examined; but we say no more of that here, as it is pretty certain that bitters are never treated by decoction, so as to be either agreeable or very useful medicines.

Besides the ordinary treatment by infusion or decoction, bitters may be treated by the application of water in two other ways. One is, by what I call a Trituration, in the manner of the Comte de la Garaye. In this practice, the substance is broken down into very minute parts; but so far

the particulars of our list, or under what peculiar modifications they are to be found.

as I can perceive, without any decomposition or division of its constituent parts.

The only separation which seems to be made is that of the more soluble from those of a firmer texture ; and so far as these more soluble parts possess the medicinal qualities of the subject, they are obtained very entirely, and that in a state more than any other agreeable to the human stomach. They seem to be much in the same state as they are obtained by an infusion in cold water : which by a proper evaporation affords the same sort of matter that is obtained by the Comte de la Garaye's apparatus. In either way we may obtain an efficacious and an agreeable medicine ; but it is to be doubted if the expense incurred in the preparation will ever allow it to come into much use.

The other management of the application of water different from the common, is that by the use of a digester. Decoctions are commonly made in open vessels, or in vessels not so accurately closed as to prevent the dissipation of volatile parts ; but this can be obviated by the use of a digester ; and though in the glass digester we employ, the heat applied can be conveniently no more than that of the boiling water, yet we find that medicinal substances can be extracted by this apparatus as powerfully as by decoction, and with this advantage, that the volatile parts which either were a part of the substance that is to be extracted, or were added to it for the purpose of rendering it a more agreeable or a more effectual medicine.

Bitters are universally extracted by spirit of wine, and even by a proof-spirit, not so largely indeed for the most part as by water, but in most instances their medicinal parts are extracted more purely ; and the tinctures, when they can be employed in tolerable quantity, seem to be more efficacious medicines than any infusions or decoctions in water.

With respect to the tinctures made with a proof-spirit, the same things are to be observed as of those made with water, that there is a gradual decomposition of the substance, and therefore that the tinctures made by a short infusion are more agreeable than those that have stood longer. It should have been observed before, that a spirituous-menstruum extracts those bitters that have any aromatic joined with them, more entirely and effectually than is done by water ; but in obtaining the spirituous extract, if this be done by drawing off the spirit by distillation, this advantage is commonly entirely lost.

With respect to both the extractions by water and by spirit, this is to be

PARTICULAR BITTERS.

Gentian.

I begin with this root because I find it to be a most simple and pure bitter, more perfectly free from any of that aromatic or astringent quality which is so frequently conjoined with others ; at the same time it is a pretty strong bitter, and has every virtue that has been ascribed to bitters in general, which we have detailed above.

There has been some question about the species of gentian most fit to be employed. The *gentiana lutea* is chosen by the British dispensatory ; but if in Germany they employ the *gentiana rubra*, it will make very little difference. In Norway they employ the *gentiana purpurea*, and perhaps with advantage. For some time past we have had the root of this species imported into this country under the title of *Cursuta*, so named from the Norwegian name of it *Skarsote*. Some persons have thought it a stronger bitter than the common gentian, or root of the *gentiana lutea* ; but I know of no experiments made for proving this ; and it appears to me in its sensible qualities to be very much the same with the common gentian.

remarked, that the most agreeable bitter is to be obtained by a short infusion ; and a stronger impregnation of the same agreeable bitter, is only to be got by a repeated cohobation of the same menstruum upon fresh parcels of the same material.

This further is to be remarked, that watery infusions, if made tolerably strong, prove very disagreeable ; and the employment of the tinctures with rectified spirit will always be limited by the menstruum ; and therefore the tinctures made with proof-spirit will always give the most convenient extraction ; and I have found that the employing a digester for brandy tinctures makes a more powerful extraction than can be got by long infusion, and that with very little trouble.

The root of gentian is of a light brown colour without, and a yellow or gold colour within. It abounds with a resin and gum intimately mixed, and has a strong bitter taste, which is rendered much more grateful, when covered with the aromatic bitter of the orange peel.

The extract of gentian is a useful stomach bitter, and is generally exhibited with an aromatic, or some additional power, in the form of pills. The dose from 10 to 30 gr.

The compound infusion of gentian is a light pleasant bitter, it strengthens the stomach, and restores the appetite, but when flatulency prevails, should be joined with about an eighth part of the tinct. cardamom. or some other carminative. The dose of this infusion is a common wine glass full twice a day.

The following are excellent formulæ:

R. Infus. gentian. comp. dr. 10.—Potas. subcarbonat. gr. 2.—Spir. Piment. M. Ft. haust. vacuo stomacho, primo mane, iterumque horâ ante prandium sumend.

That is, take of the compound infusion of gentian, ten drachms.—Prepared kali, two grains.—Spirit of pimento, two drachms.—Make into a draught to be taken on an empty stomach, early in the morning, and again an hour before dinner.

R. Infus. gentian. comp. unc. 3.—Aq. menth, pip. unc. 2.—Syr. zingib. unc. 1.—Spir. ammon. aromatic. dr. 1.—Ft. mist. capt. coch. larg. 2. in cyath. aq. font. bis vel ter in die.

That is, take of compound infusion of gentian, three ounces.—Peppermint water, two ounces.—Syrup of ginger, one ounce.—Compound spirit of ammonia, one drachm.—To form a mixture of which, two large spoonfuls are to be taken twice or thrice a day, in a glass of cold water.

R. Gentian, dr. 2.—Rhei incis. dr. 1½.—Lign. quassiaë,

dr. $\frac{1}{2}$.—Coriand. contus. dr. 2.—Aq. fervent. lb. 1.—Macerate per hor. 24, cola, capt. coch. larg. 2, primo mane, horâ 11 matutin. et horâ somni sing. diebus.

That is, take of gentian root, two drachms.—Sliced rhubarb, a drachm and a half.—Quassia wood rasped, half a drachm.—Bruised coriander seeds, two drachms.—Boiling water, a pint.—Infuse for 24 hours, strain off, and let the sick person take two large table spoonsful early in the morning, at eleven in the forenoon, and again at bed-time, every day.

R. Extract. gentian.—Myrrh.—Potas. carbonat. aa, dr. $\frac{1}{2}$.—Spir. vin. q. s.—F. pil. 16 quar. capt. 4, bis die, superbibend. cyath. aq. pur. cum. gutt. 40, mist, sequent.

Tinct. aromatic. Ph. Ed. dr. 4.—Tinct. aloes comp. dr. 1.—F. Mist.

That is, take of extract of gentian.—Myrrh.—Prepared kali, of each, half a drachm.—Make sixteen pills, of which take four pills twice a day, drinking after them a cup of pure water, adding to it 40 drops of the following mixture :

Aromatic tincture, four drachms.—Compound tincture of aloes, one drachm.—For a mixture.

Quassia.

Quassia, parts used, the wood, root, and bark.—It is the production of a tree growing in Surinam. The wood transversely cut, is radiated, white, solid, and tough; the thicker pieces preferred, the root deeper colour. Dose. Substance in pills 10 to 20 gr. every four or six hours, or 1 to 2 oz. of the infusion, made with 2 drs. in a pint of boiling water. The infusion in boiling water to stand an hour, in cold water 24 hours. We can find nothing in this wood

but a pure and simple bitter. In several specimens I have found the bitterness to be pretty strong; but for the most part it is, to my taste, not more bitter than the colombo, nor even than good gentian. We are obliged to Professor Murray for his compilation on the subject of quassia; but after all that has been said by him and Mr Ebeling, we find hardly any virtues ascribed to quassia which have not been to other bitters. Upon the whole I believe quassia to be an excellent bitter, and that it will do all that any pure and simple bitter can do; but our experience of it in this country does not lead us to think it will do more; and the extraordinary commendations given of it are to be ascribed to the partiality so often shewn to new medicines, and especially by those who first introduce them, and by those who have a connection with the country from whence they are brought.

The following are excellent formulæ:

R. Quass. ras. dr. $1\frac{1}{2}$.—Aur. Hispal. Cort. dr. 1.—Aq. fervent. lb. 1.—Stent in vase operto, per horæ spatium, et cola. Infusi colati sumantur coch. tria vel quatuor bis quotidie.

That is, take of the raspings of quassia, a drachm and a half.—Orange peel, one drachm.—Boiling water, a pint.—Let them stand in a covered vessel for the space of an hour, and then strain off, of this three or four table spoonfuls are to be taken twice a day.

R. Infus. quass. dr. 4.—Sodæ subcarbonat. gr. 8.—Tinc. cinnam. comp. dr. 1.—Aq. menth. pip. dr. 5.—Ft. Haustus ter in die sumend.

That is, take of infusion of quassia, two drachms.—Prepared natron, eight grains.—Compound tincture of cinnamon, one drachm.—Peppermint water, five drachms.—For a draught to be taken three times a day.

Infus. quass. unc. 2.—Test. ostreor. præp. gr. 15.—Spir. ammon. aromatic. gtt. 20.—Rhei pulv. gr. 2.—Ft. Haust. horâ 11 matutin. vel bis quotidie sumend.

That is, take of infusion of quassia, two ounces.—Prepared oyster shells, fifteen grains.—Compound spirit of ammonia, twenty drops.—Powder of rhubarb, two grains.—For a draught, to be taken at eleven, or twice a day.

R. Quass. incis. dr. 2.—Aq. fervent. lb. 1.—Macerâ, et frigefactum cola,—liquor. colat. Adde tinct. cardam. unc. 2.—Spir. lavend. comp. unc. $\frac{1}{2}$.—Rhei pulv. dr. $\frac{1}{2}$.—Ft. Mist. capt. coch. larg. 4, primo mane, meridie, et horâ decubitûs.

That is, take of quassia, cut in slices, two drachms.—Boiling water, a pint.—Macerate, and strain off when cold.—To this add tincture of cardamom, two ounces.—Compound spirit of lavender, half an ounce.—Powder of rhubarb, half a drachm.—Make a mixture, and take of it four large table spoonfuls early in the morning, at twelve at noon, and at bed-time.

Simarouba.

Simarouba.—The light, tough, stringy, yellowish bark of a tree growing in Guiana, and brought in long pieces. Quality. No smell; but a lasting bitter, and sub-astringent taste. Use. Chiefly in chronic diarrhœas, and dysenteries. Dose. In a decoction of 2 dr. in 2 pints of water to 20 oz. three spoonfuls every four hours; or from 10—20 gr. of the powder.

The following are excellent formulæ:

R. Simaroub. contus. dr. 2.—Aq. puræ. lb. 2.

Decoque ad dimidium et cola; dein adde tinc. cinnam. unc. 1.—Ut. ft. mist. astringens. Capt. coch. larg. 4, ter die.

That is, take of pounded simarouba, two drachms.—Pure water, a quart.—Boil to half that quantity, and strain off, then add tincture of cinnamon, one ounce. For an astringent mixture. Four table spoonfuls are to be taken three times a day.

R. Cort. Simaroub. dr. 1½.—Cort. cinnamon. dr. 2.—Acaciæ catechu, dr. 2.—Aq. fervent. lb. 1.—Macerate per horas 4, vase clauso, dein cola.—Liquor. colat. unc. 7.—Tinct. cardam. comp. unc. 1.—Confect. opii. dr. 1.—Ft. Mist. astringens. Sumt. coch. larg. 4, sextâ quâquâ horâ.

That is, take of simarouba bark, a drachm and a half.—Cinnamon, two drachms.—Catechu, two drachms.—Boiling water, one pint.—Macerate for four hours, in a covered vessel, then strain off to seven ounces of the strained liquor.—Compound tincture of cardamom, one ounce.—Confection of opium, one drachm. For an astringent mixture, of which four large table spoonfuls are to be taken every six hours.

Colombo.

The name of Colombo root, by which this article has hitherto been known in our shops, seems to have had its origin in the supposition that the root was brought to us from Ceylon; a supposition apparently strengthened by the similarity in sound of the Portuguese appellation of Calumba to the name of the principal town of that island. It being a staple export with the Portuguese, the place of growth was carefully concealed, and the plant itself was unknown to botanists, until very lately, when it was raised at Madras from a root brought to Dr. James Anderson, of that place, from Mozambique. From a drawing in the possession of the Linnæan Society, the plant appears

to be of the natural order of *Monospermum*, but the genus cannot be determined, in consequence of the female flowers not having been as yet seen.

This root is brought to us from the East Indies, and is the part in use. It comes in roundish pieces, which are covered with a rough brown bark, and, when cut transversely, exhibit a large central disk, with brown streaks, and yellow points. It is a good stomachic bitter, and has a strong antiseptic quality; softens on chewing, and tinges the saliva with a slight yellow hue. This root is considered, in the Eastern parts, as an excellent remedy in bilious complaints, particularly in the cholera morbus, having first cleansed the stomach and bowels with thin small liquids; and, as it does not belong to the class of heating bitters, it may be used in hectic cases; it is also particularly serviceable in sinkings at the pit of the stomach, and habitual vomitings. We have become acquainted with this root only within these forty years. It was first brought into Holland, where it was introduced as a remedy in dysentery; and both in Holland and in Germany it was employed in that disease with much commendation.

I find this root to be a strong and agreeable bitter, have employed it in many instances of dyspepsia with great advantage. In stopping vomiting it has frequently answered.

The following are the best formulæ:

R. Calumb. pulv. gr. 10.—Pulv. cinnam. comp. g. 5.—
Ft. pulv. bis die sumend.

That is, take of colombo powder, ten grains.—Aromatic powder, five grains.—To form a powder, to be taken twice a day.



Calumb.—Rhei pulv. aa. dr. 1.—Aq. fervent. lb. 1.—Ft.

Infus. per hor. 24, cola, liquor. colat. cap. coch. larg. 4, primo mane.

That is, take of colombo sliced, powder of rhubarb, equal parts, one drachm, boiling water a pint.—Make an infusion for 24 hours, strain off, take of the strained liquor four large table spoonfuls the first thing in the morning.

R. Calumb.—Rhei pulv. aa. dr. 1.—Cons. aur. Hisp. q. s.—Ft. pil. 30—quarum capt. pil. 3, ter in die.

That is, take of colomb, rhubarb, in powder, of each, one drachm, conserve of orange peel, as much as is sufficient.—Make into 30 pills, of which 3 are to be taken three times a day.


Athemis Nobilis.


Camomile.—Under this title we have two plants whose flowers are employed, as marked in our list; and there is some question which ought to be preferred. The virtues are precisely of the same kind; but I have always judged the Roman or double-flowering camomile to be the strongest; and if any regard is to be had to the essential oil, this certainly affords the greatest quantity; and I am informed, that in warmer climates, where it is a native, the qualities of it are much stronger than with us.

These flowers have been long celebrated as stomachics; and I have found them answer both in powder and in infusion the purposes of any other bitters. Before the introduction of the Peruvian bark, they were much employed in the cure of intermittent fevers; and our celebrated country man, Dr. Pitcairn, was of opinion, that their powers, in this respect, were equal to those of the Peruvian bark.

Hoffman seems to have thought them a very effectual, and at the same time a safer remedy. I have accordingly employed them: and agreeable to the method of Hoffman, by giving, several times during the intermission, from half a drachm to a drachm of the flowers in powder, have cured intermittent fevers, more especially when joined with myrrh. I have found, however, that these flowers were attended with this inconvenience, that, given in a large quantity, they readily ran off by stool, defeating thereby the purpose of preventing the return of paroxysms; and I have found, indeed, that without joining with them an opiate, I could not commonly employ them.

The following are the best formulæ:

R. Chamæmel. pulv. scr. 1.—Syr. cort. aur. q. s.—Ft. Bolus bis die sumend.

That is, take powder of camomile, one scruple.—Syrup of orange-peel, as much as is sufficient.—Make into a bolus, to be taken twice a day.

R. Anthemid. flor. dr. 2.—Rhei incis. dr. $\frac{1}{2}$.—Coriand. contus. aa, dr. $\frac{1}{2}$.—Aq. fervent. lb. 1.—Ft. Thea. capt. ante prandium cyath. plen. sing. diebus.

That is, take of camomile flowers, two drachms, Rhubarb sliced, and coriander seeds bruised, of each half a drachm.—Make into a tea, of which a cupful is to be taken every day before dinner.

R. Anthemid. flor. in pulv. trit. scr. 1.—Myrrh. pulv. gr. 5.—Rhei pulv. gr. 3.—Ft. pulv. (vel syrupo simplici, bolus,) bis in die sumend.

That is, take of camomile flowers, in powder, one scruple.—Myrrh in powder, five grains.—Rhubarb in powder, three grains.—Make into a powder, or into a bolus, by means of simple syrup, to be taken twice a day.

Salix.

Willow.—The bark of the *salix alba*, pentandria, vitellini, has been proposed as a substitute for the Peruvian bark. The testimonies of Stone, Clossius, and Gunzius, are very strongly in their favour : and although we have not had many opportunities of employing them in intermittent fevers, the few that have been made show that they may be in some cases an effectual remedy.

Their sensible qualities seem to me to be that of a pretty strong, but sufficiently agreeable, bitter, with somewhat of stypticity. These qualities persuade me that they are very valuable medicines, and promise to be a substitute for the bark as much as any other substance I have known to be offered.

The following is an excellent formulæ :

R. *Salicis vitellinæ alb. vel pentand. pulv. dr. 3.*—*Quassia.*—*Myrrhæ pulv. aa, dr. 1.*—*Aquæ fontanæ, lb. 1.*—*M. f. m. cujus cap. cochl. 2 vel. 3, ter quaterve sing. diebus.*

That is, take of willow bark, finely powdered, 3 drachms ; quassia, powdered, myrrh in powder, each one drachm ; pure water, a pint.—Mix them together, and let the patients take two or three table spoonfuls three or four times a day.

General Observations.—I must beg leave to observe, that the strength, as well as the dose of these bitters, must be adapted to the constitution and circumstances of the patient. If they heat too much, they must be weakened, or taken along with some drops of the elixir of vitriol. When bitters lie heavy on the stomach, and lessen, instead of mending, the appetite, they ought to be omitted, and the cure must be attempted by other remedies.

These remedies are usually applied for disorders, peculiarly of the stomach, which they brace, and they are usefully combined with other kinds of medicines, which are presently to be treated of.

SECT. XCII.

Astringents.

Astringents are such substances, as applied to the human body, produce a contraction and condensation in the soft solids, and thereby increase their density, and force of cohesion. If they are applied to longitudinal fibres, the contraction is made in the length of these; but if applied to circular fibres, they diminish the diameters of the vessels or cavities which the fibres surround.

The operation of astringents in general, in condensing the solid, appears from their use in the tanning or making of leather, in which they are so frequently employed.

The same operation also appears from their antiseptic power, which seems to depend upon their preserving the firmness and cohesion of the animal substances to which they are applied, for a much longer time than the firmness would have continued in these substances without such application.

By what means astringents produce the contraction of the solid parts of animal bodies, is not very evident. It does not seem to be by introducing a matter into their substance; and in some cases it seems to be rather by absorbing and abstracting their fluid parts. In some cases, where the substances applied are such as coagulate the fluids of the human body, as acids and alcohol, we can readily understand how the same should condense and contract the solids formed of the same fluids which those matters coagulate. It does not, however, appear, that other astringents, void of acidity, act in the same manner; and their operation must be referred to an at-

traction taking place between these astringents and the particles of the animal solids.

In forming a table of medicines according to their several operations on the human body, it seems proper to distinguish them as they operate upon the simple solids, which is much of the same nature in the dead as in the living body; or as they operate upon the sensible and moving solids, which have their qualities and powers only as they exist in a living body. This distinction, on many occasions, will be necessary and useful, but we cannot follow it throughout; and on these occasions, where the medicines at the same time operate upon both the simple and living solids, the consideration of their operation cannot be taken separately.

This is the case with respect to our present subject, as astringents often operate upon the solids of both kinds. This, indeed, has not been always observed; and it has been commonly supposed, that astringents act more upon the simple than upon the living solid: and therefore, that they act almost only on the parts to which they are immediately applied. A very learned physician in writing on hemorrhagy, has this expression: "I do not lay any great stress upon the use of internal astringent remedies, because it does not appear likely from reasoning that they should do any service; and I am far from being convinced by experience that they ever do, except perhaps in hemorrhagies of the *primæ viæ*." Heberden, in *Med. Trans.* Vol. II. 432. This, however, I cannot hold to be just; and by the corrugation and constriction of the whole mouth and fauces, which happens from a small portion of astringents being applied to a small part of the tongue, I hold it to be demonstrated that astringents act upon the sentient nerves; and therefore that the astringent effects may be communicated from one part to very distant parts of the body. The same con-

clusion appears clearly to be formed from this, that astringents taken into the stomach shew their effects in other parts of the body so quickly, that they can hardly be supposed to have passed further than the stomach itself; and therefore their sudden effects in distant parts must be ascribed to an astringent power communicated from the stomach to those other parts.

It may, indeed, be alleged, that the astringent matter is in some cases carried farther than the stomach, and into the course of the circulation; but it must still be observed, that in many of those cases the quantity of matter introduced is so small, that when again diffused in the mass of blood, and equally distributed to the different parts of the body, it is obvious, that the portion of it applied to a particular part cannot be sufficient to produce any effect upon it; and therefore the effects which appear must be ascribed to the general operation on the stomach. Of all this doctrine, and particularly of the propagation of astringent power from the stomach to other parts, we have a strong proof in this, that some of the most simple astringents taken into the stomach very soon after prevent the recurrence of a paroxysm of an intermittent fever, which implies a very general operation on distant parts.

As it is, therefore, established, that astringents act upon the moving fibres, as well as upon the simple solids, it will be readily conceived, that to their operation on the former their most considerable effects on the living body are to be ascribed. As they contract the moving fibres, and increase their force of cohesion, they must increase their contractibility, or what I call their tone; and they are, therefore, often properly named Tonics; and upon the same ground are fitly enough named Strengtheners or Corroborants.

In the first place, by their effects upon the human body, or by the taste they give in the mouth, creating a sense of constriction not only in the parts with which they come immediately in contact, but also in the whole of the internal surface of the mouth and fauces. This sense of constriction is different in different substances; and I believe its degree may be taken as a mark of the power which such substances may exert as astringents in the stomach, or other parts of the body.

In the second place, we discover an astringent quality in bodies by their being applied to a solution of green vitriol, in which they produce a black colour. This we suppose to be owing to the astringents abstracting the acid of the vitriol from the iron it was before joined with; and that therefore the iron falls down in the form of a black powder. I shall not insist further on the theory of this operation, but shall endeavour to apply it to our purpose.

As experiments show that astringent substances applied to the solution of vitriol produce more suddenly a black colour, and that of a greater degree of blackness, in proportion to the other marks they give of their astringency, so we may employ this experiment to determine the power of astringency in different substances. For this purpose, the learned Bergius, in his *Treatise on the Materia Medica*, has given us his experiments of the application of almost every vegetable substance to the solution of green vitriol; and I have much reason to believe, that his experiments have been accurately made and faithfully reported. From them, I think we learn what I have just now alleged, that the astringent power is in proportion to the suddenness with which they strike a black colour, and to the degree in which they produce it. By this the learned author

points out what substances are the most powerful astringents ; and in like manner, what are the weaker kinds of the many which formerly entered promiscuously into our lists of astringents : and I shall hereafter make use of his experiments in determining the astringent power of particular substances.

The general effects of astringents on the human body are expressed above in the definition ; but in what different states of the body, that is, in what diseases they are to be employed, is yet to be related.

In all cases of general debility, they may be supposed to be useful ; and in that state which has been called a Cachexy, and which often forms the beginning of dropsy, the preparations of bark, more especially when joined with steel, have been employed with much benefit : but I do not know of any simple astringent, that in the same case has been employed with great advantage. In one case, their power in taking off the atony of the system is very remarkable, and that is in the case of intermittent fevers. It is true, that, even for this purpose, their tonic powers are much increased by their being combined with bitters and stimulants, as we shall explain in another place ; but in the mean time, as the most simple astringents frequently answer the purpose, it does not prevent our perceiving that astringents by themselves are capable of increasing the tone of the moving fibres over the whole body.

Astringents are considered as especially useful in restraining excessive evacuations ; and in the first place, hemorrhagies, or the evacuations of red blood ; and I have no doubt of their being fitted for this purpose, or of their truly answering it : but I must own, that there is no practice in which I have been more frequently disappointed than in the employment of astringents in the case of

hemorrhagy. I ascribe my failure to this, that though astringents taken into the stomach give some increase of tone over the whole system; yet they are not powerful enough for producing such constriction in distant parts, as may be sufficient for overcoming the impetus of the blood in the vessels.

Astringents are also employed in restraining the excess of serous evacuations; and are therefore employed in the case of diarrhœa. Here their efficacy is evident; and will be readily accounted for by their being immediately applied to the parts affected. But it is extremely necessary here to take notice of an error very generally prevailing in writers on the *materia medica*, in their relating the virtues and powers of astringents. They very generally mention the virtues of astringents as equally adapted to diarrhœa and to dysentery; but I maintain that these two diseases are very different from one another; so that while diarrhœa consists in an increased evacuation from the exhalants and excretories on the internal surface of the intestines, which may be restrained by astringents applied, the dysentery consists or depends upon an increased constriction in a considerable portion of the intestinal canal, which must be increased by the application of such astringents. This is now well understood; and practitioners very universally observe, that astringents are not only ineffectual, but very hurtful in dysentery; and therefore we assert, that the marking of astringents as equally adapted to both diseases is a pernicious error*.

Beside diarrhœa, astringents are said to be suited to the restraining of other serous evacuations; but I must say, that in practice I have been as much disappointed in these cases as in the cases of hemorrhagy: and upon the same

* Of this we shall speak more at large, when treating on putrid fever and dysentery.

ground, that the effects of astringents taken into the stomach are not propagated so powerfully to distant parts as to produce the constrictions required in them. This I have had occasion to observe with regard to the *Leucorrhœa*, or *Fluor Albus*. For the cure of this disease, I find forty remedies recommended by writers on the *materia medica*; and I have met with forty cases of it, in which not one of those remedies were of any service.

It may be supposed by some, that there is an analogy between those cases of increased serous evacuations, and the excessive discharge of a serous fluid from ulcers; and, therefore, that to remedy this, internal astringents may be employed. I believe the propriety of this measure may be well founded; but at the same time it does not appear that the good effects in these cases depend upon a constriction produced on the extremities of the vessels pouring out the fluids, so much as upon restoring the tone, perhaps the inflammatory state, of the vessels that is necessary to the production of laudable pus*.

* With respect to the pharmaceutical treatment of astringents, we in the first place observe, that they are most useful when they are taken in their entire state, and when given, as the common language is, in substance; and we are persuaded that the gastric liquor extracts them more powerfully than any other menstruum we could apply. It is, however, on many occasions, proper to employ them in a liquid form; and for that purpose they have been treated by distillation, infusion, and decoction.

Astringents very rarely consist of odorous or volatile parts. They are very universally of a fixed nature, and nothing rises from them in distillation with water, and even in those cases where their odorous and volatile parts arise, it is found that no part of the astringent quality is at the same time communicated to the distilled water; and therefore the distilled waters drawn from astringents formerly kept in the shops, were on that account absolutely inert.

Astringents are properly enough treated by infusion, and readily yield their qualities either to an aqueous or spirituous menstruum. The extract obtained by water is in larger proportion than that obtained by

But previous to our entering particularly upon this subject, it may be necessary to consider

PARTICULAR ASTRINGENTS.

<i>Cinchona cordifolia,</i>	<i>Yellow Bark.</i>
———— <i>lancifolia,</i>	<i>Quilled Bark.</i>
———— <i>oblongifolia,</i>	<i>Red Bark.</i>

These names of our three medicinal barks of the genus *Cinchona* were originally given in a publication, entitled, *Papel Periodico de Santa Fé* (1792), by Dr. Mutis, who, from a residence of more than forty years in South America, had the best opportunity hitherto obtained by any botanist of investigating this important tribe, and whose observations are more fully detailed in his pupil Zea's communications to the *Annals of Natural History*, published at Madrid (1800, tom ii, p. 196.)

Bark seems to be a substance in which the qualities of bitter and astringent are conjoined. These are sufficiently obvious, and seems to be universally allowed. It may also have somewhat of an aromatic quality; but this certainly is not considerable, and I shall not take any further notice of it.

spirit: but that the astringency is greater in the one than in the other is not certainly determined; and the choice of the infusions is made rather according as the menstruum is more or less adapted to the purpose of the medicine, than by any consideration of the astringent power extracted by it.

Astringents are also treated by decoction in water; and in this way a stronger impregnation can be obtained than by infusion: but it appears to me that the astringent matter is extracted in a more entire state by infusion, and that in decoction there is always some decomposition takes place; with what effect, however, on the substance as a medicine, we cannot determine.

As a bitter and astringent conjoined, I consider the bark as a powerful tonic. As we have before shewn that these qualities in their separate state give tonic, so it will be readily allowed, that, conjoined together, they may give one still more powerful; and as such we are now to consider the bark in its effects and virtues, according as these appear in the various cases of disease.

The first to be taken notice of is, its operation on the stomach. In many cases dyspeptic symptoms manifestly arise from a loss of tone in the muscular fibres of the stomach; and in such cases as other bitters are, so the bark is a remedy, and one of the most powerful. Nobody doubts of its being a tonic with regard to the stomach; and it is equally well known that the state of the stomach is readily communicated to the rest of the system.

The bark is more strengthening and less heating than any of the bitters. It may be given either in substance or decoction, or infused in cold or in boiling water, in lime-water, wine, brandy, or rum.

The bark in substance, frequently disagrees with delicate stomachs, and occasions sickness, gripes, and sometimes a looseness. An infusion or decoction of it in water, especially, if some grateful aromatic, such as cinnamon or nutmeg, be added, is less apt to produce these effects; but when infused in brandy, with some bitters or aromatics, it will agree well with most people. The bark in substance often sits lighter on the stomach, if a glass of red port be taken after every dose of it; and the gripes and purging, which it occasions in some, may be certainly prevented by adding, for a few days, a few drops of laudanum to it; for after the stomach and bowels have been accustomed to the use of the bark, it generally occasions either much less disturbance, or none at all.

For several years past, I have frequently joined the bark and bitters in the following form :

R. Cinchon. Pulv. unc. iv.—Rad. Gentian.—Cort. Aurant. aa. unc. i. $\frac{1}{2}$ Misce.—Infunde in spir. vin. Gall. lib. iv. in balneo arenæ par dies vi. et cola.

That is, take of cinchona four ounces, gentian and orange peel of each an ounce and an half.—Mix and infuse in four pints of brandy in a sand bath for six days, and strain off.

Of this tincture I generally give one table spoonful, with four or five spoonfuls of water, every morning, an hour and a half before breakfast, and between seven and eight in the evening. I sometimes add to each pound of this tincture, an ounce or more of the sp. lavend. comp. which improves its taste, and makes it sit better on some stomachs.

I have, says Dr. Cullen, myself, taken the above tincture in the morning, for eight months together, and with remarkable advantage. For three or four years before, I had been much troubled with wind in my stomach, a giddiness and sometimes a faintness. I observed in the morning, soon after taking this medicine, a grateful sensation in my stomach, accompanied with better spirits than I had at any time through the day, or than I ever found from drinking wine, even when I used it freely. I have ordered this tincture to many patients, who have taken it for two or three months successively, and, after intermitting it for some time, have begun again. Most of them have found benefit, and those most who used it longest. The cases were chiefly weak and windy stomachs, with a general delicacy, or debility, of the nervous system.

Although the bark is preferable, as a strengthener, to any of the bitters, yet it does not wholly supersede their use.

The bark alone will not sit so well on many stomachs, as when it is joined with an agreeable bitter; and I think I have found more benefit, myself, from the above tincture, than from the bark alone either in substance or decoction. With regard to the safety of taking, for a long time, the bark, against which many have had great prejudices; I cannot say that I do recollect its proving hurtful in any case in which I have ordered it, unless where it happened to disagree with the patient's stomach. About fourteen years since, I swallowed, in sixteen days, near four ounces of it in substance, when I laboured under a catarrhus cough, without feeling any bad effects from its astringent quality. In a tertian intermittent, attended with a cough and spitting, after the use of vomits and some pectorals, I have prescribed the bark in the usual quantity, without the breast being any ways hurt by it. I have had repeated experience of its virtues in curing a hoarseness after the measles, unattended with a fever or difficult breathing. Lastly, the success of the bark in resolving indolent glandular swellings*, may shew that it is not possessed of any considerable obstructing quality.

We proceed therefore upon the supposition that the bark possesses a tonic power, and that the action of this power in the stomach will sufficiently explain its operation in preventing the recurrence of the paroxysms of intermittent fevers: for I see no foundation for referring it to any mysterious and unexplained specific power, which, however, some writers seem still disposed to maintain. I hold it to be established as a fact, that both astringents and bitters, in their simple and separate state, have proved often sufficient to prevent the recurrence of the paroxysms of intermittent fevers: and that they more certainly do it

* See Medical Inquiries and Observations, Vol. I.

when combined together. Both these facts I have not only from the testimony of the most creditable authors, but from particular experiments made by myself for the purpose of ascertaining them.

Among other diseases complicated with fever, the dysentery is to be taken notice of as a disease in which the propriety of using the bark does not seem to be very clearly ascertained. When this disease is of its proper nature; that is, depending chiefly upon a constriction of the colon, and frequently in its beginning attended with some phlogistic diathesis, the use of the bark appears to me to be absolutely pernicious. I have indeed said above, that even in this state, bitters, by their laxative quality, may frequently be useful: but such a quality in the bark is very uncertain; and therefore the analogy with bitters will hardly imply the use of a bitter that may be in this way of uncertain effect, and may be in danger, by its tonic and inflammatory powers, of proving hurtful. In the beginning of dysentery, we judge the bark to be improper; but in the advanced state, when some symptoms of putrescency appear, or when the disease has changed in some measure into the state of diarrhoea, the bark may possibly be employed with advantage.

In another case of dysentery, which sometimes happens; that is, when it puts on a tertian type, and may be considered as a part of the tertian fever, at the same time epidemically prevailing, the bark may become an absolutely necessary remedy.

There is a disease complicated with fever, in which I find the use of the bark to be somewhat nice and difficult; and that is in catarrhal affections. In these, arising, as they commonly do, from cold, an inflammatory diathesis is, I believe, constantly present; and this seems to forbid the use of the bark altogether. But there are two cases

in which it may be admitted ; the one is when the catarrhal affection is combined with an intermittent fever, as mentioned before : and I have often observed the most frequent and violent fits of coughing to be joined with the paroxysms, and particularly with the cold stage of such paroxysms. In such cases I not only do not avoid the bark, but fly to it with the more haste.

There is also another case of catarrhal affection in which the bark is of great service. This is in those habitual and frequently returning catarrhs, which depend upon a weak and imperfect perspiration by the skin, and this again upon a weaker force in the action of the heart and arteries. In these cases I suppose there is a greater determination to, and a greater than usual accumulation of, fluids in the lungs ; and that these circumstances and their effects are only to be obviated by invigorating the system of the aorta, for which I hold the bark to be the most effectual mean.

Another case of delicacy, on which I would here remark, is that of hæmorrhagy ; in which the use of the bark is, in my opinion, very inaccurately ascertained, but may, I think, be determined in this manner. When the hæmorrhagy is of the active kind, that is, accompanied with a phlogistic diathesis, which however is seldom the case, the bark is a pernicious medicine, and I have always found it to be so. There are, however, very many cases of passive hæmorrhagy, a frequent instance of which occurs in the hæmorrhagia, where the disease depends upon a laxity of the extremities of the uterine vessels, which are therefore readily opened by every irritation applied to the system, or to the diseased part. In such cases the bark is the most proper, and, when the remote and exciting causes can be avoided, an effectual remedy. Upon this subject two remarks may be made : one is, that though an

hæmorrhagy may seem to be excited by irritation, it is not therefore to be immediately concluded to be of the active kind, and therefore forbidding the use of the bark. The other remark is, that the bark, in passive hæmorrhagy, does not act as an astringent, in which way its powers are very inconsiderable, but as a tonic, which might be hurtful in any hæmorrhagy of the active kind.

After mentioning catarrh and hæmoptysis, I am, in some measure, necessarily led to say something with respect to the use of the bark in the Phthisis Pulmonalis.

It is generally allowed, that phthisis depends for the most part on a scrophulous constitution; and no person, I presume, will deny, that the tubercles, ulceration, and even inflammation of the lungs, are often connected likewise with a state of debility of the system at large; especially when the complaint has made any degree of progress. Practitioners are now so sensible of this truth, that the antiphlogistic plan of treatment is seldom carried to that length which was formerly the practice. The insufficiency of it in the advanced periods of the disease, became every day more apparent; so that physicians have been obliged to acknowledge, that the intention of taking away a small quantity of blood occasionally, is rather to procure a temporary relief, than with the expectation of effecting a cure. Many have even admitted, that it is rational, in the mean time, to support the vigour of the body by means of tonics and a more generous diet; hence the use of myrrh and chalybeates, which have been highly recommended by Dr. Griffiths and Dr. Saunders.

But at the same time that the debility attendant on phthisis pulmonalis has not entirely escaped the attention of medical men, they have contended, that the inflammation and ulceration being peculiarly situated, from the great quantity of blood which circulates through the lungs,

any increased impetus of circulation, produced by stimulants, must be severely felt, and a train of unfavourable symptoms immediately excited. Some have affirmed, that the exhibition of Peruvian bark has been known to occasion the greatest difficulty in respiration under such circumstances, and that it is therefore to be considered in the light of an uncertain or hazardous remedy. Authorities, however, are not wanting in favour of the bark, when prudently administered. Besides Morton, who extols it highly, we have the testimony of Sir John Pringle in its favour. He observes, that he had frequently given three or four spoonfuls of a decoction of bark twice a day, without observing that it heated, or obstructed the breathing; but, on the contrary, that it had the best effect*.

If the quantity of the remedy employed by this author be thought too inconsiderable to afford any conclusion in its favour, it may be proper to refer to an account of several very alarming cases of pulmonary affections successfully treated by a more liberal exhibition of bark, lately published in the Medical Communications†.

The authorities also formerly mentioned, under the head of catarrh, a disease much connected with consumption, may be adduced in further support of the utility of bark in this disorder; and it may contribute to the same purpose, to insert in this place, from an author of reputation, who has lately written on the *Materia Medica*, the following passage: “*Binos ipse ab empyemate Chinchina (i. e. Cort. Peruv.) curavi. Quo magis sputa fœtent, eo certior cura. In phthisi pulmonali sæpè quidem præclara præstat, sæpè*

* Dr. Thornton's *new* practice is to give tonic medicines, which is employed in all other ulcers, and at the same time to diminish local inflammation by the inhalation of a reduced atmosphere. Vide Dr. Beddoes's Considerations.

† See Medical Communications, Vol. I. p. 260

autem nihil efficit. Quando apthæ accesserunt, symptomaticæ in hoc morbo, non evidenter nocuit, nisi sputa suppressisse diceres. Certè, ubi sputa in phthisi nimis abundant, Cortex indicatur; si verò, cum oppressione pectoris, subito diminuantur, Cortici non inhærendum.—Nullam vidi noxam ex moderata dosi Chinchina quotidie sumpta in phthisi, etiamsi sanguis, per venam sectam emissus, crusta inflammatoria obductus subinde fuit*.”

I am well aware that there are certain cases to which the bark is by no means adapted; but the same objection may be made to any plan of treatment.—All that is necessary then to be done, is to make a cautious trial of such tonic remedies; as, for instance, of an infusion or decoction of bark in the first place; and if no inconvenience arises to the patient, good encouragement is afforded for the exhibition of the powder, with or without the tincture of roses. I have seen it employed more than once, in this mode of combination, with advantage, and should on that account, in most cases, give it the preference.

We are certainly called upon, by the miserable sufferers who are afflicted with consumption, to give them this or some other similar chance of a recovery. If the ulceration, or what may be sometimes as bad, or worse, a considerable state of induration, or numerous tubercles without any supuration, be found beyond the reach of medicine, the satisfaction of protracting the life of the patient a few months, by strengthening the body, may still perhaps remain. And I must confess, that on the whole, I should be disposed to form greater expectations from bark, in preventing this formidable disease, in scrophulous and delicate habits disposed to it, than in wholly subduing it after it has once established itself; though even here it deserves a full trial.

* Vide Bergius Materia Medica, Tom. I. p. 109.

I have met, says Dr. Cullen, with cases in which, with all the symptoms of phthisis, the exacerbations of the hectic were marked with more or less of a cold stage, and regularly, at stated periods commonly quotidian, but sometimes tertian. In such cases, I have given the bark with the effect of preventing the return of such paroxysms for some time, and at the same time with the relief of almost all the other symptoms of the disease. I never, however, in such cases, made a complete cure; for, in spite of large exhibitions of the bark, the paroxysms, in less than a fortnight or three weeks after they had been stopped, always returned; and though they were again and again, by the same means stopped, they returned with greater violence, and proved fatal, with all the ordinary symptoms of phthisis.

As the Phthisis Pulmonalis depends so often upon tubercles of a peculiar nature, which with no probability can be resolved by the bark; so this is another reason for my avoiding the use of it in this disease. But whether, Dr. Cullen adds, there be cases resembling very exactly the phthisis from tubercles, in which, however, there are none present, and therefore a more curable disease, and perhaps admitting the use of the bark, I cannot positively determine, but am disposed to believe, that there are cases, with all the symptoms of phthisis pulmonalis, without tubercles*; in which case the bark may possibly be useful. In all the cases of convalescence which happen after a purulent expectoration, I judge the disease to have been of this kind.

I shall next take notice of its use in some other diseases; but after what I have said above of tonics in general, and of bitters more particularly, it only remains to say here, that

* Dissection has certainly proved this supposition.

in the cases to which bitters are adapted, the bark as being more powerful, must be especially proper.

There are two diseases seemingly depending on the laxity of the system ; and therefore it has been supposed that the bark might be, and is alleged that it has been, actually useful in the cure of them. These are the diseases of scrophula and rickets. I have no doubt that in both a considerable degree of laxity and flaccidity takes place in the system ; but I am very far from thinking that either of the diseases consist alone, or even chiefly, in this circumstance ; and I have before adduced my reasons to render it probable that these diseases depend upon certain peculiar conditions of the system, which do not arise from, but, indeed rather induce a general laxity of, the frame.

Spasmodic diseases, depending upon a weakness of tone in the system, are very often cured by the use of the bark. Accordingly, it has been much employed in many of these, and particularly in cases of epilepsy ; but in this I have been often disappointed. When epilepsy depends upon organic affections of the brain, I believe no remedy is to be found for it : or when this disease is connected with a plethoric state, and is excited, as it frequently is, by an occasional accumulation of the blood in the vessels of the brain, I think neither the bark nor any other tonic can be properly or safely employed. It is only when epilepsy depends upon a mobility of the system that we can expect the bark to prove a remedy ; and in such cases it may possibly have often proved useful ; but I have hardly found it to be so, and am of opinion, that the fossil tonics, as chalybeates, cuprum ammoniacum, flowers of zinc, or white vitriol, are always found more effectual.

There is indeed one convulsive disorder in which I have found the bark remarkably useful ; and that is the chorea sancti viti, which I believe to depend upon the state of

mobility at a certain period of life. In this disease, I think the preparation of copper and zinc cannot be employed with safety so often, or rather so long, as might be necessary; and therefore, that chalybeates and bark are the safer remedies; and we are of opinion that the latter is more safe than the former.

With respect to asthma, my doctrine must be the same as with respect to humid catarrh. And when the asthma depends upon the mobility of the system, as in the hysteric or convulsive asthma of Sir John Floyer, the bark is an useful remedy; and in some instances I have found it to be so.

There remains to be mentioned some spasmodic affections, in which the bark has been much celebrated. These are commonly named Hysteric, and are of various forms. In these cases in which such paroxysms as I have before described, under the title Hysteria, appear, I take this to be the genuine form that may be strictly so named; and to be a disease of one determined kind, and occurring perhaps only, at least especially, in females of an irritable temperament.

There are a great number of ailments which are frequently named hysteric, or more commonly nervous diseases, that are of very great diversity; and by their symptoms, not to be brought under any general character. If therefore we are to attempt any thing with regard to their general nature, it must be by presuming to establish a general cause. This I allow to be an uncertain plan: but I do not know at present how to do better.

In attempting this, I would refer the nervous diseases to one or rather two general causes; the one is a weakness of tone, and thence a mobility of system, in sanguine temperaments, or in such as are not manifestly melancholy: and the other is, in melancholic temperaments, a more or less

torpid state of the nervous power prevailing ; in consequence of which various irregularities in the functions of the nervous system arise.

All this would need much explanation, but I cannot attempt that here ; and I do not think myself sufficiently prepared to enter upon it fully. The only use I shall make of it at present is to say, that wherever morbid affections of the chronic kind can be perceived to depend upon a weakness of tone and mobility of the system, chiefly appearing in symptoms of dyspepsia, the bark is likely to prove an useful remedy ; but that in the cases of torpor with firmness of tone, it is likely to be not only useless, but even a hurtful remedy. The latter I take to be the case, in what I would strictly name hypochondriasis. Of this, indeed, medical people have various notions, but seldom clear or well digested ; and if some have asserted that they have found the bark useful in cases of hypochondriasis, I suspect they have not properly distinguished between hypochondriasis and dyspepsia. The latter may be frequently attended with timidity, doubt, and despondency ; but it may still be a very different disease from the proper hypochondriasis.

I have thus endeavoured to consider the use of the bark in all the variety of disease in which it may be applied, or in which it has been commonly employed ; and upon the subject it remains only to say, in what manner it may most properly be exhibited.

The following are very excellent formulæ :

R. Decoct. chinchon, unc. 6.—Tinct. cinchon comp unc. 1.—Myrrh. pulv.—Calumb. pulv. aa, dr. 1.—Potas. subcarbonat. scr. 1.—F. Mist. capt. coch. larg. 2, primo mane, horâ 6 vespere, et horâ somni.

That is, take decoction of bark, six ounces.—Compound tincture of bark, one ounce.—Myrrh, columbo, of each

equal parts, one drachm.—Prepared kali, one scruple.—For a mixture.—Two table spoonfuls are to be taken early in the morning, again at eleven, at seven, and at bed-time.

Observations.—This is a *most excellent formula* to invigorate the system. In some cases a table spoonful of it, night and morning, may be given, and twice that quantity at the other periods. If there be any affection of the chest, the columbo may be left out, and the quantity of myrrh doubled. Where the kidneys are affected, the quantity of kali must be two drachms, the myrrh left out, and only one table spoonful be taken four times a day. Where the patient is much troubled with wind, a drachm and an half of æther may be added, and if the bowels are constrained, they should be kept open; where piles have happened, add the electuary of senna and sulphur, equal parts, a tea spoonful or more night and morning. But when that is not the case, the following pills are excellent :

R. Pil aloes cum myrrh, gr. 12.—Hydr. submuriat. gr. 10.—Extr. gentian, scr. 1.—Ferr. sulphat. gr. 10.—Syr. simp. q. s.—Ft. Pil. 8, capt. pil. 1, horâ somni et primo mane.

That is, take of pill of aloes, with myrrh, twelve grains.—Calomel, ten grains.—Extract of gentian, one scruple. Vitriolated iron, ten grains.—Simple syrup, as much as is sufficient.—Make into 8 pills. One is to be taken at bed-time, and another in the morning.

The following is one of Dr. Hugh Smith's famous formula, who so successfully adopted the tonic and stimulant practice in asthenia :

R. Decoct. cinchon, unc. 6.—Tinct. cinchon. comp. unc. 1½.—Tinct. gentian. comp. unc. ½.—Æther vitriol, dr. 2.—Ft. Mist, capt. coch. larg. 3, horâ 11 matutin et 6 tâ vespere,

That is, take of decoction of bark, six ounces.—Compound tincture of bark, an ounce and a half.—Compound tincture of gentian, half an ounce.—Vitriolic Æther, two drachms.—For a mixture.—Take 3 large table spoonfuls at eleven, and at six in the evening.

R. Decoct. cinchon, unc. 6.—Tinct. cinchon comp. unc. 1.—Acid vitriol. dil. dr. 1.—Syr. cort. aur. unc. $\frac{1}{2}$.—Ft. Mist. cujus coch. larg. 2, ter quaterve indies adhibeantur.

That is, take of decoct. of bark, six ounces.—Compound tincture of bark, one ounce.—Diluted vitriolic acid, one drachm.—For a mixture, of which two table spoonfuls three or four times a day, are to be administered.

R. Cinchon. cordifol. in pulv. crass. contus. unc. $\frac{1}{2}$.—Ros. rubr. exsiccat. dr. 2.—Aq. fervent. unc. 12.—Macera in vase idoneo, et liquorem frigefactum cola.—Infus. colent. unc. 7.—Adde acid. vitriol. dil. dr. 1.—Syr. simp. unc. $\frac{1}{2}$.—Ut. F. Mist. cujus capt. coch. larg. 3, vel. 4, bis vel ter in die.

That is, take of yellow bark, in rough powder, half an ounce.—Red roses, dried, two drachms.—Boiling water, twelve ounces.—Let them remain together in a proper vessel, and when cold strain off 7 ounce of this liquor, add one drachm of diluted vitriolic acid, simple syrup, half an ounce.—To form a mixture, of which 3 or 4 table spoonfuls are to be taken twice or thrice a day.

Cortex Quercus.

Oak Bark.—This is considered as the most powerful of the vegetable astringents; and its universal use and preference in the tanning of leather renders the opinion very probable. Accordingly it has been much employed as an astringent medicine, and commended for every virtue that has been ascribed to astringents either internally or externally em-

ployed ; but, except its degree of power, it has no peculiar qualities to distinguish it from other astringents. I have frequently employed the decoction with advantage, in slight tumefactions of the mucous membrane of the fauces ; and in several persons liable, upon a slight application of cold, to a prolapsus uvulæ, or falling down of the uvula. In many cases this decoction, early applied, has appeared useful in preventing those disorders which otherwise were wont to arise to a considerable degree. I have, indeed, almost constantly joined a portion of alum to these decoctions ; for I have frequently found that a solution of alum alone, of the strength it could be conveniently employed in, did not prove so effectual.

I have employed the oak-bark in powder, giving it to the quantity of half a drachm every two or three hours during the intermissions of an ague ; and, both by itself, and joined with camomile flowers, have prevented the return of the paroxysms.

All these virtues, in a considerable degree, are found to belong to the cupulæ, or scaly cup, which embraces the bottom of the acorns.

Gallæ.

Galls.—Although these substances are the work of animals, we consider them as entirely of a vegetable nature, and put them here immediately after the oak-bark, as they are an excrescence from the same tree, and a substance of the same qualities with the bark we have been just now treating of. It is supposed to be the most powerful of vegetable astringents ; and I am ready to believe it to be so, though it has not been employed so often, or in such a variety of cases, as many others have been. About the

beginning of this century, in some parts of France, the Gallæ had got a reputation for the cure of intermittent fevers; and it was pointed out as a proper object of attention to the Academy of Sciences; who accordingly appointed Mr. Poupert to enquire into the matter. His report may be seen in the Memoirs for the year 1702. It amounts to this, that in many cases the galls cured the intermittents; but that it failed also in many cases in which the Peruvian bark proved effectual.

In this country, of late, a particular use of galls has prevailed. Finely powdered, and mixed with eight times their quantity of hog's lard, they are made into an ointment; which, applied to the anus, night and morning, has been found to relieve hemorrhoidal affections; and we have known some instances of its being useful.

The direction is,

R. Gall. in pulv. trit. dr. 1.—Adipis suill. præp. unc. 1.
—Tere simul ut fiat unguentum, quo partes affectæ nocte maneque illinantur.

Granati Cortex.

The rhind of the fruit of pomegranate.—The strong styptic taste of this part, and the black colour it strikes with green vitriol, shew sufficiently its astringent power; and it is commonly supposed to be among the strongest of this kind. As, at the same time, it gives out such a large portion of its substance to water in infusion or decoction, it seems to be particularly fit for affording a liquid astringent; and I have frequently found it particularly useful in gargles, in diarrhœa, and in external applications.

A formula against diarrhœa is:

R. Cort. granat.—Cinnam.—Rad. tormentil. Flor ros.

rubr. aa dr. 1.—Coque in aq. puræ et lactis vaccin.—sing. libra ad consumpt. dimidii; coletur et partitis docibus quotidie sumatur.

That is, take of rhind of pomegranate.—Cinnamon.—Tormentil root.—Flowers of red roses, of each one drachm.—Boil them in a pint of milk and the same quantity of water, until they are reduced to a half; strain off, and at intervals this is to be taken during the day.

Lignum Campechense.

Logwood.—This wood is of a considerably astringent quality, and its use in dying is a sufficient proof of it. It has not, however, been employed except in the case of fluxes, and it is alleged to have been very useful in dysenteries; but we judge this to have been at the end of these only, when the disease was in the state of diarrhœa; for it was from the employment of this very medicine in the beginning of dysenteries, that I learned, says Dr. Cullen, what mischief arose from the use of astringents in the beginning of that disease.

The following are the most common formulæ:

R. Lign. campechin. ras. unc. 1.—Aq. distil. lb. 1½.—Decoque ad libram unam, et cola. Liquor. colat. unc. 7, addetur tinct. cinnamon. unc. 1.—Ft. mist. astringens; cujus cap. coch. larg. tria post singulas sedes liquidas.

That is, take of raspings of logwood, one ounce, distilled water, a pint and a half, boil to a pint, and strain off; to 7 ounces of this liquor, add one ounce of tincture of cinnamon.—To make an astringent mixture, of which take 3 large table spoonfuls after each liquid motion.

R. Extr. lign. campech. scr. 1.—Aq. cinnam.—Aq. menth. pip. aa. dr. 6.—Ft. haustus, 6tâ. quaquâ horâ sumend.

That is, take of extract of logwood, one scruple.—Cinnamon.—Peppermint water, equal parts, six drachms; for a draught to be taken every six hours.

Kino.

Kino, the gum-resin.—We are informed by Dr. Fothergill, that it is a gum which exudes from incisions made in the trunks of a certain tree, called Pau de Sangue, growing in the inland parts of Africa; but the botanical account of this tree we have not yet met with.

Both by its sensible qualities, and by its striking black, with a solution of green vitriol, we have grounds for supposing it a powerful astringent; and we have found it prove to be such in several instances of diarrhœa. I am informed also by a good practitioner, of its having been useful in some uterine hemorrhagies, particularly those after child-bearing. In some cases of fluor albus I have been disappointed of its effects when employed by itself; but the Edinburgh college have properly joined it with alum in the pulvis stypticus; and this composition proves one of the most powerful astringents I have ever employed.

The best formulæ are,

R. Kino pulv. dr. 1.—Alum. pulv. dr. 3.—Ft. pulv. styptic. (Ph. Edin.) cap. gr. 5 ad 15, quartâ quâquâ horâ.

That is, take of gum kino, in powder, one drachm.—Alum in powder, three drachms.—Sign it the styptic powder of the Edinburgh Pharmacopœia, from five to fifteen grains, are to be taken every four hours.

R. Kino pulv. gr. 5.—Pulv. cret. comp. cum. opio gr. 10.—Ft. pulv. vel syrupum zing, addendo, bolus, ad alvum constringendum mane sumend.

That is, take of kino in powder, five grains.—Compound powder of chalk, with opium, ten grains.—For a powder, or by adding syrup of ginger, a bolus, to be taken in the morning, to constringe the bowels.

R. Kino pulv. gr. 10.—Confect. opiat. scr. 1.—Ft. bolus horâ somni sumend.

That is, take of kino in powder, ten grains.—Opiate confection, one scruple.—Make into a bolus to be taken at bed-time.

R. Rhei pulv. gr. 6.—Kino pulv. gr. 10.—Pulv. cret comp. cum opio. gr. 12.—Ft. pulv. ex. cyath. vin. rubr. lusitan. bis die sumend.

That is, take of rhubarb in powder, six grains.—Kino in powder, ten grains.—Compound powder of chalk, with opium, twelve grains.—Make into a powder, to be taken in a glass of red wine, twice a day.

R. Kino dr. 1.—Gum. arab. scr. 2.—Syr. pap. alb. q. s.—Ft. linctus, cujus cochl. minimum sæpe in die delingatur.

That is, take of kino, a drachm, gum arabic two scruples, syrup of white poppies, as much as is sufficient, for a linctus, of which a small tea spoonful is to be dissolved in the mouth often in the day.

Bistorta.

Bistort, both by its sensible qualities and by the colour it gives with green vitriol, and by the extracts it affords, seems to be one of the strongest of our vegetable astringents, and is justly commended for every virtue that has been ascribed to any other. As such we have frequently employed it, and particularly in intermittent fevers, and in larger doses than those commonly mentioned in materia medica writers. Both by itself and along with gentian,

we have given it to the quantity of three drachms in one day.

Tormentilla.

This root, by its sensible qualities, and by its striking black with green vitriol, appears to be one of the strongest astringents of this country; and therefore it has been justly commended for every virtue that is competent to astringents. I have had several instances of its virtues in this respect; and particularly I have found, both by itself and as joined with gentian, cure intermittent fevers; but it must be given in substance and in large quantities. Two parts of tormentil root to one of camonile flowers in powder, both cheap plants, the products of our own country, form in conjunction an excellent substitute for the Peruvian bark.

Alumen.

Alum.—I do not think it my business here to give any account of the practices by which this substance is produced from several fossil matters, as this has been done already by several writers, extremely well, especially by Fourcroy; nor do I think it necessary after Margraaf, to give any account of the peculiar part of clay that with the vitriolic acid, enters into the composition of alum. It is enough for me, that this is a substance very well known; and that in the same state in which it is employed in various arts, and as commonly exhibited in our shops, it is sufficiently pure and fit for the purposes of medicine.

Here we are to consider only its use in medicine, and chiefly as an astringent of the most powerful kind. It is used both internally and externally. With respect to its internal use, I am surprised to find that it seems not to

have been employed with other astringents in diarrhœa. Some materia medica writers, indeed, mention its being suited to cure this disease; but I have not met with any practical writer who prescribes it in such cases. Governed like other practitioners by imitation and habit, I have seldom employed it; but I have employed it sufficiently to make me judge that in diarrhœas it may be used with advantage.

It has been given internally, chiefly in the cases of hemorrhagy from the lungs or from the uterus. It should be given at first in small doses, as it is ready to irritate the stomach: and in several instances I have found it rejected by vomiting. In urgent cases, however, the doses must be frequently repeated and increased, for it has been only from large quantities given, that its effects have appeared to be considerable. We begin by giving it in doses of five grains; but have gone the length of a scruple, and have given such a dose several times a day.

Since the time that Helvetius wrote *Des Pertes de Sang*, and proposed alum as a specific for the cure of these, it was long common to employ alum in the form proposed by Helvetius, that is, as fused with a certain proportion of *Sanguis draconis*, supposed to be an astringent; but as this is a medicine not soluble in the human fluids, and therefore absolutely inert, it has been justly rejected. If, as Dr. Lewis supposed it to be, more slowly dissolved in the stomach, and therefore introducing the alum more gradually, it might be proper; but we are persuaded that the *Sanguis draconis* rather prevented the operation of the alum altogether; and if the slow introduction is to be studied, this may be obtained by smaller doses than even those above-mentioned. The Edinburgh College have thought proper to continue the title of *Pulvis Stypticus*, that our practitioners had been long accustomed to; but

they have added a more valuable astringent than the dragon's blood, that is, the gum kino, which does not make in colour or dose a medicine different from the composition formerly kept in the shops.

Alum is more frequently used externally than internally, particularly in gargles, in relaxations of the uvula, and other swellings of the mucous membrane of the fauces, when there is not at the same time any acute inflammation present. In many persons who are liable to be affected with this swelling from slight applications of cold, we have known the disease prevented, or soon removed, by the use of a decoction of oak-bark, to a pound of which half a drachm of alum and two ounces of brandy were added. The same gargle, without the spirits, is useful in the case of spongy swelled gums and loose teeth, from scurvy or other causes.

Alum is also useful in curing the ophthalmia membranarum, and seems to me more powerful for this purpose than white vitriol. It is commonly employed in the form of the coagulum aluminosum; but I have found the solution in water to be still more effectual, employing from two to five grains of alum to an ounce of water.

The formulæ are,

R. Alumen. in pulv. gr. 10.—Cons. ros. rubr. scr. 1.—Ft. bolus, bis terve indies sumendus.

That is, take of alum in powder, ten grains.—Conserve of red roses, a scruple.—Make into a bolus, to be taken twice or thrice a day.

R. Alumen. in pulv. trit. scr. 2.—Infus. ros. unc. 6.—Mel rosar. unc. 1.—Ft. gargarism. sæpius in die utend.

That is, take of alum in powder, two scruples.—Infusion of roses, six ounces.—Honey of roses, one ounce.—Make a gargle to be frequently used during the day.

The six last articles are usually employed in diarrhœas,

and hæmorrhagies: it is very common to consider also the chalk as an astringent, but it can have its effect only from absorbing acidity prevalent in the primæ viæ, and being combined with opium, which has a known sedative effect rendering the bowels torpid for a time, chalk has certainly obtained a greater reputation than it merits.

The following is the usual formula :

R. Mist. cretæ. unc. 1½.—Tinct. cinnam. dr. 2.—Tinct. opii gtt. 15.—Ft. Haustus, 6ta quaquâ horâ sumend.

That is, take of the chalk mixture, an ounce and an half, tincture of cinnamon two drachms, tincture of opium fifteen drops, for a draught, to be taken every six hours.

Starch is, on account of the mucilage it contains, often used in diarrhœa, in clysters, and otherwise, for which last purpose, an ounce of licorice root sliced, with half an ounce of linseed and starch, infused in a quart of boiling water, is employed with advantage to sheathe and lubricate. —This is also an useful beverage in pleurisies and colds.

SECT. XCIII.

Pure Stimulants.

The idea commonly annexed to the term stimulant, is that of a power suited only to excite the action of moving fibres ; but I am here to consider stimulants more generally, as exciting the motion of the living principle, whether producing sensation or as producing the action of the moving fibres.

Very generally, indeed, the motions begin in the former: but it is not necessary, as some have supposed, that they should always do so; for there are powers which, directly applied to the moving fibres, excite their

action without any previous sensation excited, or without any intervention of the brain; which appears clearly from hence, that the motion of moving fibres can be excited so long as the living or irritable principle subsists in them, though they are entirely separate from the rest of the body, and entirely therefore removed from all sense.

The operation of stimulants, either in an extensive or more limited view, is difficult to be explained; because our knowledge of the living principle or nervous power, and of the various modifications of the different states of its mobility, is still very imperfect. Some have imagined, that the operation of stimulants might be mechanically explained by the figure of their particles; but while the Corpuscularian philosophy is at present so much deserted, we do not think it necessary to take any pains to discuss the futilities advanced on this subject: and however it may be, it seems enough to observe, that we know in general that the nervous power may be in different states of mobility, and that there are substances which, applied to the nerves, have a power of increasing or diminishing their energy. The former we have named Stimulants, the latter Sedatives.

This then is the general idea of stimulants, that they are powers capable of increasing the mobility, and of exciting the motion of the nervous power. Here, however, it is proper to remark, that by the nervous power being acted upon by stimulants, we strictly mean not only that electric fluid which is readily moveable in the brain and nerves, but also that oxygenous fluid which is under a peculiar modification in the moving fibres, and gives them what we name the inherent power. It is fit also to remark here, that in this manner we must distinguish between a stimulant and tonic powers, which both act upon the same power, and have been commonly confounded together.

Although they may mutually increase the effects of each other, they are still in their nature and operation to be considered as distinct and different.

Having thus given a general idea of the operation of stimulants, I proceed to consider the various modifications of that operation as it is determined either by the circumstances of the parts of the body to which they are immediately applied, or by the various natures of the substances that may be employed to act.

In the first place we shall consider them as they are applied to organs of peculiar sense, which are excited by the impression of certain matters only ; or as they are applied to parts which have a sensibility in common with the whole of the nervous system, and when their effects are modified by the state of the moving fibres in the parts adjoining.

With respect to the whole of the stimulants applied to the organs of sense, we have to remark, that the exercise of sensation is in general a stimulant power, and is a chief means of supporting the mobility of the living principle in the nervous system ; more especially in what concerns the animal functions.

It relates also to all the cases in which sensation is produced, to remark, that the effects of the stimulus seems to be in proportion to the force of the impression producing them. As a certain degree of this is on many occasions necessary to render them pleasant ; so in proportion to the pleasure arising from them, their stimulus is greater : and farther, as all strong impressions give pain, so in proportion to this also, they are more strongly stimulant.

From certain other circumstances beside that of force, sensations are either agreeable or disagreeable ; the former being always stimulant ; the latter being, as I judge,

always sedative, or perhaps indirectly stimulant, as we have explained before.

Of particular sensations, those of light and noise have their stimulant effects in proportion to their force; or sometimes independent of that, according to certain circumstances, rendering them more agreeable.

Odours are very much on the same footing, but have often more immediate and strong effects on the sensorium; and to explain that, it may be observed, that with respect to other parts of the system, the medical virtues of many substances seems to depend upon their odorous parts; which seems to point out their particular activity with respect to the nervous system.

Sapid bodies do not so readily or powerfully affect the sensorium; but the activity of sapid substances applied to other parts, often corresponds with the force of their impressions upon the tongue.

In considering the operation of substances upon the skin, it is not always easy to distinguish the effects of impressions applied to what is strictly the organs of sense, from the effects of impressions made upon that sensibility which the skin has in common with all the other parts of the nervous system.

It seems to be an operation on the nervous papillæ of the skin, when a certain gentle undulatory motion applied to the skin produces a sense of tickling, which often proves stimulant. It is also chiefly an operation not only upon the same organ, but partly also upon that of the common sensibility; when certain substances applied to the skin produce a sense of itching, which is always stimulant, and often continues till it produces redness and other circumstances of inflammation.

These are the observations which I can make on the

action of stimulants applied to organs of sense : and this in general is to be remarked, that though we should expect that impressions upon these organs should be especially and only communicated to the brain, and although, which is truly the case with all moderate impressions, exciting peculiar sensations, which for the most part act only upon the brain, and little or more either upon the organ itself, or upon the parts immediately adjoining to it ; yet all strong impressions seem to act very often more on the neighbouring parts than upon the brain or general system depending upon it.

The action upon the neighbouring parts seems to be especially the exciting of the action of the blood-vessels of the part immediately adjoining to the organ of sense. Thus, a strong light excites a stronger action in the numerous blood-vessels intermixed with the nerves of the retina. What happens in the ear we do not know ; but strong odours inflame the internal membrane of the nose, and strong and painful impressions upon the tongue inflame the surface of it. What happens on the skin I have mentioned before ; and I give that as an example of the action of stimulants, both on parts which are not organs of peculiar sense, and on those which have only the common sensibility of the nervous system. Such are also all the internal surfaces, in which therefore we perceive only the effects of stimulants by their producing inflammation on their surfaces.

But we are now to consider the operation of stimulants upon the parts that are endued only with the sensibility that is in common to the whole of the system ; and we cannot illustrate this better than by marking their action upon the skin.

When certain substances are applied to the skin, the

first sensation they produce is that of heat in the part; and commonly at the same time some redness appears upon the surface, which I take to be a mark of an operation upon the blood-vessels of the skin. There is frequently, indeed, at the same time, a sense of pricking pain; yet often without that, the effect chiefly consists in an increased action of the vessels mentioned, and which accordingly proceeds to every circumstance of inflammation, as pain, tumor, blistering, suppuration, and gangrena. In many cases, some of these effects are produced in the part, without their being communicated to the rest of the system; and I consider them therefore as an immediate operation upon the moving fibres of the vessels of the skin, without the intervention of sensation or of any action of the brain.

It is indeed true, that, in many cases, a sensation arises, and that a stimulus is communicated to the brain, and the symptoms of its increased energy as a preternatural frequency of pulse; and, in consequence of this, an increase of heat over the whole body is produced. But it is to be remarked, as often happening, that the stimulus communicated to the brain is not in proportion to the inflammation produced in the part, which we have occasion frequently to observe in those paralytic cases in which we apply inflammatory stimulants to particular parts.

These are the general effects of stimulants on the parts to which they are immediately applied; but I am now to mention what is a very important particular of the animal œconomy, which is, that many stimulants have little effect on the parts to which they are immediately applied, but excite motions in other, and sometimes very distant parts of the body. These motions, however, have commonly a relation to the parts to which the stimulus had been

immediately applied; and they are commonly such as are suited for throwing off the stimulant matter from those parts.

Such are the motions of sneezing, hawking, coughing, vomiting, and the voiding of urine and fæces. In all of these, the motions are excited by an uneasy or painful impression from a matter applied to certain parts; and the motions excited are manifestly fitted for throwing off the irritated matter from these parts.

These phenomena have been commonly explained upon the supposition of a certain consent of nerves between those of the parts irritated and of the parts acting; but no particular connection of nerves can be found that will account for the exciting of these actions, without their exciting at the same time many others; and it must be referred to an institution of Nature which we cannot explain, and can only say, that the motions excited are suited to the general purpose of Nature, either to resist and avert injuries from external causes threatening the animal œconomy, or to produce certain actions necessary to that œconomy. Of the latter kind are the evacuations of stool and urine; and of the former are the other motions of sneezing, hawking, coughing, and vomiting.

In illustration of this, it may be remarked, that the same actions are produced by stimuli applied to very different parts, if these actions are suited to the purpose, as we may call it, of these different parts. Thus a full inspiration and a concurring contraction of the abdominal muscles is produced by a stimulus applied to the stomach, or by an uneasy sensation at the neck of the bladder, or by a like sensation in the rectum.

These may separately excite the full inspiration; not therefore from any particular consent of nerves, but

merely from its being necessary to the purpose of Nature : and accordingly it is excited, not only on these occasions, but on every other where Nature intends a strong exertion of strength, to which a full inspiration is always necessary.

It is farther to be remarked, that it is the administration of Nature in the business of the animal œconomy, which not only excites those motions, but also regulates the force which they are exerted to be more or less, according as the occasional circumstances may require. Thus, a sensation that excites to an evacuation of urine, if the urinary bladder be full, and there is no resistance to the issuing of the urine, the inspiration produced will be to a very moderate degree only; but if there is a resistance to the evacuation of urine, the inspiration and other concurrent actions are excited to a greater degree and with greater force.

That the business in such cases is directed by the purpose of the œconomy, and not by the consent of nerves, appears further from hence, that is not one set of actions, all of them constantly excited by the same stimulus, but more or fewer, according to the strength of effort that is necessary. Thus, the sensation exciting an evacuation by stool, according to the force on that occasion to be exerted, produces the action of more or fewer parts of the body. Not only a very full inspiration and a strong contraction of the abdominal muscles are produced, but a contraction, in order to a general tension, takes place in almost every muscular fibre of the body. The fists are clenched, or the hands grasp some fixed body very firmly; and even the muscles of the cheeks are often very strongly contracted.

There may seem to be some mystery in all this; but no body will be stumbled with respect to this part of the

animal œconomy who considers the ordinary operation of the will. This does not directly or consciously direct the action of any particular muscle ; but willing only an end and purpose, the muscles fitted to execute or produce this end are immediately brought into action.

The actions we have mentioned are the effects of stimuli, which we suppose to be powers exciting the motion of the nervous power ; and though the effects are determined by the will or propensity, we still suppose the general power of the substance acting, and are therefore what we call direct stimulants. It is now, however, to be remarked, that there are motions excited in the body without the application of such stimulants, and by circumstances of a contrary kind ; that is, merely by a sense of difficulty of resistance, or of debility, in the exercise of functions.

Thus, sighing manifestly arises from a sense of difficulty in the transmission of the blood through the vessels of the lungs. Coughing often arises from the same sensation, without any direct stimulus applied to any particular part of them. Vomiting often arises merely from a sense of debility, as when it accompanies a syncope, from causes which cannot be supposed to operate directly upon the stomach ; and the vomitings so frequently produced by narcotics, seems to me to be more properly explained by a sense of the debility induced by them, than by their affording any direct stimulus. We explain in the same manner the yawning and stretching which occurs to persons coming out of sleep, and on some other occasions, when no other cause can be supposed than a sense of some difficulty in the exertion of voluntary motions.

These seem to afford unquestionable proofs of a power in the animal œconomy, to obviate and correct certain deviations from the standard of health ; and both these, with the instances given above of direct stimuli producing

motion suited to throw off matters applied which give pain and uneasiness, or that may prove noxious to the system, concur in shewing, that there is in the animal œconomy a power to obviate and correct, in a certain degree, every thing not suited to the health of the œconomy, and which has properly enough been named the *Vis Naturæ Conservatrix et Medicatrix*.

After so many evident instances of this, we can hardly doubt of the like powers taking place also in the more obscure internal parts, in many cases of disease which are spontaneously cured by the operations of Nature ; or in other words, by the spontaneous powers of the animal œconomy, and particularly that the state of the circulation is often regulated so as to be excited to a stronger action, merely by the occurrence of resistance or debility. All this particularly applies to render it probable, that the effect of sedatives, exciting the action of the system, either in general, or of particular parts, may be explained entirely by their being effects of a *vis medicatrix Naturæ*, obviating injuries which threaten the whole system or particular parts: and to finish this subject, nothing can better shew that active powers can be excited merely by a sense of debility, than this, that a stimulus accustomed to support the activity of the system, happening to be withdrawn, the sense of debility thence arising produces various actions in the system, or in particular parts. All these means of exciting the action of the system, or of particular parts, we name *Indirect Stimulants*, as has been explained before.

After thus mentioning the operation of stimulants, as chiefly applied to external parts, we proceed to consider their application to the internal ; and which is especially by their being taken into the stomach. Here they may operate, in the first place, upon the moving fibres of the stomach itself, exciting their action for the purposes of

digestion ; or to an higher degree, for exciting vomiting, which we shall consider hereafter under the head of Evacuations : or, in the second place, stimulants may act on the stomach as a peculiar organ of sense. Here it is surely needless to say how readily and constantly all impressions made upon the stomach are communicated to other parts of the system, and particularly to the origin of the nerves.

The operation of stimulants taken into the stomach is not always exhausted there ; for they are often carried on, very much unchanged, into the intestines ; and there also operate, in the first place, upon the fibres of the intestines analogous to the like operations upon the stomach. They increase and render more steady the action of the moving fibres ; and I have no doubt that the stimulant power from the intestines, as well as from the stomach, may be communicated to the brain, though it is probable that the stomach is endowed with more sensibility suited to this purpose.

As many of our stimulants are very little changed in the alimentary canal, so they are carried with their entire power into the blood-vessels ; and we are therefore to consider what may be their operation there. We judge it to be very little ; 1st, Because they are there necessarily diffused in a great quantity of liquid, which must very much weaken, if not entirely destroy, their operation. 2dly, Because they are there involved in a quantity of viscid fluid ; such as we know, in all cases, to weaken the action of stimulants. And, lastly, Because we believe the internal surface of the blood-vessels to have very little sensibility, and therefore little liable to be affected by weak impressions. From all these considerations, we consider the operation of stimulants, taken in by the mouth, to be in the blood-vessels very little ; and know of no observation

or experiment that leads us to think otherwise. I am of opinion, that any such effects as have been supposed can be better explained by their operation on the stomach and brain.

We still, however, know that many stimulant matters are carried into the blood-vessels, and are carried off by several excretions*: and as we may justly impute their inert state in the blood-vessels to their being there extremely diffused; so, when they are again accumulated, and as it were concentrated in the secretory organs, they may there operate in promoting the different secretions.

Having now considered the operation of stimulants in general, I have only to conclude the subject with mentioning, that with regard to all of them, they are subject to the laws of custom; and that, therefore, considered as impressions, their power by repetition is constantly diminished; but that, considered in their effects, the actions produced by the repetition may become more readily excited, and thereby the power of stimulants may seem to be increased.

Opium† and Alcohol.

Opium and *Alcohol* increase all the secretions and

* As when strangury is produced.

† *Purified Opium*.—This concrete gum resinous inspissated juice, derived from the *Papaver Somniferum*, is brought from the Levant in flat round casks, covered with leaves, to prevent their adhesion; therefore is necessarily cleansed from those foreign matters by solution and colation. It contains a resin, essential oil, a principle of odour, and a soapy extract; is of a darkish brown colour, and yields a faint smell and a bitterish taste. Opium is a very powerful remedy, and is a principal ingredient in many officinal compositions. It mitigates pain, procures sleep, allays irritability and spasm, and promotes perspiration; particularly when joined with camphor, ipecacuanha, or some medicine of the diaphoretic class.

This valuable drug will not agree with every constitution; it should

absorptions*. The increase of the secretion of sensorial power appears from the violent exertions of drunken people ;

therefore be administered with caution to those who are not accustomed to it. The general dose is from half a grain to 1 or 2 grains, and may be repeated or increased at proper intervals, in proportion to the degree of pain or spasmodic affection. The operation of a moderate dose is supposed to continue about six hours ; but in case of an increased painful spasm, it will be necessary to give a second dose in two or three hours time. It is soluble in every menstruum, but most so in proof spirit, which is allowed to dissolve three-fourths of dried opium. The best mode of exhibiting it is in that of a pill with an equal quantity of hard soap, which divides its substance, and renders it more readily soluble in the stomach, and consequently quicker in its effect. The form of a watery solution is also an eligible mode of giving opium.

* *Highly Rectified Spirit*.—The kali, or alkaline salt, imbibes the remaining phlegm, and the disagreeable unctuous matter of the spirit, and carries them down to the bottom of the vessel. A few particles of the kali will be apt to rise, which may be prevented by adding a small piece of burnt alum, the acid of which unites with the kali, and forms a vitriolated kali, which remains in the cucurbit. The true specific gravity of alcohol is, to that of distilled water as 815 to 1000 ; whereas that of rectified spirit is, as 835 to 1000.

Rectified Spirit of Wine contains in 100 parts 95 of alcohol and 5 of phlegm, and a pound by measure should weigh 13 oz. Rectified spirits are applied as menstrea, to extract the virtues of medicines, are the same from whatever subjects they are obtained, are separable from aqueous fluids by a heat less than boiling water, and dissolve essential oils ; but expressed oils sink in them.

Spiritus Vinosus Gallicus, or the vinous spirit, called brandy, properly diluted, and occasionally taken, is a pleasant useful cordial, but when habitually drunk, will surely prove a destructive poison. Applied by itself, or moderately diluted with water, it dissipates the heat from inflamed parts without repelling the humour, which is not always the case with Goulard water.

Spiritus Vinosus Tenuior.—Proof spirit contains 55 parts of alcohol, and 45 of distilled water in 100 parts, and its specific gravity is as 930 to 1000 of distilled water. That which is prepared with rectified spirit and distilled water, is a more pure and certain menstruum than the proof spirit, which is drawn from various fermented liquors. Each of these spirits is denominated alcohol in the New Nomenclature.

the secretion of sweat is more certainly excited by opium or wine than by any other medicine; and the increase of general heat, which these drugs produce, is an evidence of their effect in promoting all the secretions; since an increase of secretion is always attended with increase of heat in the part, as in hepatic and other inflammations.

But as they at the same time promote absorption; those fluids which are secreted into receptacles, as the urine, bile, intestinal, and pulmonary mucus, have again their thinner parts absorbed; and hence, though the quantity of secreted fluid was increased, yet as the absorption was also increased, the exertion from these receptacles is lessened; at the same time that it is deeper coloured or of thicker consistence, as the urine, ulvine fæces, and pulmonary mucus. Whereas the perspiration being secreted on the surface of the body is visible in its increased quantity before it can be reabsorbed; whence arises that erroneous opinion, that opium increases the cutaneous secretion, and lessens all the others.

It must, however, be noted, that after evacuations, opium seems to promote the absorptions more than the secretions; if you except that of the sensorial power in the brain, which probably suffers no absorption.

In ulcers the matter is thickened by the exhibition of opium from the increased absorption of the thinner parts of it; but it is probable that the whole secretion, including the part which is absorbed, is increased; and hence new fibres are secreted along with the matter, and the ulcer fills with new granulations of flesh. But as no ulcer can heal till it ceases to discharge; that is, till absorption becomes as great as the excretion; those medicines which promote absorption only, are more advantageous for the healing an ulcer after it is filled with new flesh; as the

Peruvian bark internally ; with bandages and solutions of lead externally.

There are many pains which originate from a want of due motion in the part, as those occasioned by cold ; and all those pains which are attended with cold extremities, are generally termed nervous. These are relieved by whatever excites the part into its proper actions, and hence by opium and alcohol ; which are the most universal stimulants we are acquainted with. In these cases the effect of opium is produced, as soon as the body becomes generally warm ; and a degree of intoxication or sleep follows the cessation of the pain.

These nervous pains (as they are called) frequently return at certain periods of time, and are also frequently succeeded by convulsions ; in these cases, if opium removes the pain, the convulsions do not come on. For this purpose it is best to exhibit it gradually, as a grain every hour, or half hour, till it intoxicates. Here it must be noted, that a much less quantity will prevent the periods of these cold pains, than is necessary to relieve them after their access ; as a grain and half of opium given an hour before the expected paroxysm, will prevent the cold fit of an intermittent fever, but will not soon remove it when it is already formed. For, in the former case, the usual or healthy associations or catenations of motion favour the effect of the medicine ; in the latter case these associations or catenations are disordered, or interrupted, and new ones are formed, which so far counteract the effect of the medicine.

When opium has been required in large doses to ease or prevent convulsions, some have advised the patient to admit the use of wine, as a greater quantity of opium might then be exhibited ; and as opium seems to increase absorption more, and secretion less, than vinous spirit, it

may in some cases be useful to exchange one for the other; as in diseases attended with too great evacuation, as diarrhœa, and catarrh, opium may be preferable; on the contrary, in tetanus, or locked-jaw, where inflammation of the system might be of service, wine may be preferable to opium. I have generally observed, that a mixture of spirit of wine and warm water, given alternately with the doses of opium, has soonest and most certainly produced that degree of intoxication which was necessary to relieve the patient in the *epilepsia dolorifica* of Dr. Darwin.

There is likewise some relief given by opium to inflammatory pains, or those from excess of motion in the affected part; but with this difference, that this relief from the pains, and the sleep which it occasions, does not occur till some hours after the exhibition of the opium. This requires to be explained; after the stimulus of opium or of alcohol ceases, as after common drunkenness, a consequent torpor comes on; and the whole habit becomes less irritable by the natural stimuli. Hence the head-aches, sickness, and languor, on the next day after intoxication, with cold skin, and general debility. Now in pains from excess of motion, called inflammatory pains, when opium is given, the pain is not relieved till the debility comes on after the stimulus ceases to act; but then, after the greater stimulus of the opium has exhausted much of the sensorial power; the less stimulus, which before caused the pain, does not now excite the part into unnatural action.

In these cases the stimulus of the opium first increases the pain; and it sometimes happens, that so great a torpor follows, as to produce the death or mortification of the affected part; whence the danger of giving opium in inflammatory diseases, especially in inflammation of the bowels; but in general the pain returns with its former violence, when the torpor above-mentioned ceases. Hence

these pains, attended with inflammation, are best relieved by copious venesection, other evacuations, and the class of medicines called sedatives, before explained.

These pains, from excess of motion, are attended with increased heat of the whole, or of the affected part, and a strong quick pulse; the pains from defect of motion are attended with cold extremities, and a weak pulse: which is also generally more frequent than natural, but not always so.

It must be observed, that a frequent repetition of the use of this class of medicines so habituates the body to their stimulus, that their dose may gradually be increased to an astonishing quantity, such as otherwise would instantly destroy life; as is frequently seen in those who accustom themselves to the daily use of alcohol and opium; and it would seem that these unfortunate people become diseased as soon as they omit their usual potations; and that the consequent gout, dropsy, palsy, or pimpled face, occur from the debility occasioned from the want of accustomed stimulus, or to some change in the contractile fibres, which requires the continuance or increase of it.

Æther.

This is entirely an artificial substance, formed by a combination of alcohol with a concentrated acid. For a long time we were acquainted with it as formed with the vitriolic acid only; but we have since learned, that not only the other fossil acids of nitre and sea-salt, but that also the vegetable acid, may be managed so as to form an æther, or an oil of great volatility. Although we are only very well acquainted with the vitriolic æther, all of these formed of the other acids seem to be endued with the same antispasmodic power; and how far this is anywise different in

the different species, is not yet properly ascertained. They are employed in all spasmodic affections, whether of the whole system or of the alimentary canal; and the suddenness with which they are diffused, gives them great advantages.

The following is an excellent formula :

R. *Æther. vitriol.*—*Spir. junip. comp.* aa, unc. $\frac{1}{2}$.—*Mist. camphor.* unc. 7.—*Pulv. gum. arab. dr.* 2.—*Ft. Mist. cap. coch. larg.* 2, 2dâ. quâque horâ.

That is, take of vitriolated æther.—Compound spirit of juniper, equal parts, half an ounce.—Camphorated mixture, seven ounces.—Powder of gum arabic, two drachms. For a mixture of which take two large table spoonfuls every two hours.

Cantharides.

The acrimony of this insect, and, when applied to the skin, its inflammatory nature, which may be readily carried so far as to raise a blister, is well known to all the world ; and the effects of its rubefacient and blistering powers, in the cure of many diseases, are known to every practitioner. These effects, however, are not to be taken notice of here. It is only the powers of the cantharides, when taken into the body, and employed as an internal medicine, that I am to consider.

The cantharides taken internally, whether in substance or in solution, if in a certain quantity, they may be considered as a stimulant and heating substance ; and I have had occasion to know them, taken in large quantity, to have excited violent pains in the stomach, and a feverish state over the whole body.

The cantharides, however, seems to act only in a concentrated state ; for taken in moderate quantity, it is so much diffused in the fluids, both in the alimentary canal and in

the mass of blood, that it seldom shews any effects on the general system. But this seems to be almost peculiar to this substance, that, given even in moderate quantity, it very readily passes to the kidneys; and being thus in a concentrated state when carried on to the bladder, they give a considerable irritation and inflammation to the neck of it, in consequence of which a frequent stimulus to the voiding of urine, and a painful difficulty in the voiding of it; symptoms which are very well known to every medical man under the title of *Stranguary*, are produced.

From the effects mentioned, it is sufficiently evident, that the substance of the cantharides goes to the kidneys; and it is with much probability supposed, that such a stimulus applied there must promote the secretion of urine. This effect, however, does not always in fact appear; and Dr. Carmichael Smith asserts, that in his frequent exhibitions of the tincture of cantharides, he never once observed the secretion of urine increased. In many instances of stranguary, produced by the application or exhibition of cantharides, I have not found, though I have often enquired after it, the quantity of urine sensibly increased. And however it may be explained, though the substance of cantharides operates often upon the neck of the bladder, it may be doubted if at the same time it operates upon the kidneys; as, along with the stranguary so often occurring, I have never met with pains in the back, or other marks of an affection of the kidneys.

From these observations, it may be doubted if cantharides have properly any diuretic power; but the authority of the late eminent and learned Werlhof cannot be declined. In the *Commercium Literarium Norimbergense*, Werlhof gives a remarkable instance of the diuretic power of cantharides, and informs us, that he had frequently experienced the same in dropsy and other diseases; and upon

such an authority I can no longer doubt of the power in question.

It, however, may be considered, whether the obtaining the diuretic effects of cantharides may not depend upon that administration of them which Werlhof employed. He gave a grain of powdered cantharides for a dose, and repeated this every four hours; and it was only after the third dose that a suppression of urine, of many days standing, began to yield; and I will give the rest of what relates to this subject in his own words, *Operum*, p. 699. “*Post tertium granum fluere urina parum grumos sanguinolenta, dein pituitosa, tandem limpida coepit, cum dysuria. Continuavi, quia symptomata cetera statim mitigata sunt, medicaminis usum, ad unam usque dosin: quo facto magis magisque, et tandem largissime ad plures indies mensuras sine febre, dolore, prodiit urina limpida, imminutis symptomatis omnibus, sensimque sola ejus remedii ὑπερεργία, convaluit homo, jamque sanus vivit.*”

Cantharides have been frequently employed in the cure of cutaneous diseases, and are for this particularly recommended by Dr. Mead; and as they may justly be supposed to pass by perspiration as well as by urine, the instances given of their utility may be very true. My learned friend, Dr. Carmichael Smith, amongst other attempts which he thought of for the cure of cutaneous diseases, very properly thought of trying the cantharides. In one case they proved a remedy; but in some others, though given in large quantities, they entirely failed; and, so far as I know, the experiment has not been prosecuted farther.

This is an excellent liniment:

R. *Linim. sapon comp. unc 1½.—Tinct. cantharid. unc. ½.*
—*Ft. Linimentum, quo pars dolens fricetur sing. noct.*

That is, take of the compound soap liniment, an ounce and a half.—Tincture of cantharides, half an ounce.—For a

liniment, with which the painful part is to be rubbed every day.

Raphanus Rusticanus.

Horse-Radish.—The root of this only is employed ; and it affords one of the most acrid substances of this order, and therefore proves a powerful stimulant, whether externally or internally employed. Externally, it readily inflames the skin, and proves a rubefacient that may be employed with advantage in palsy and rheumatism ; and if its application be longer continued, it brings on a blistering, with the effect I formerly mentioned.

Taken internally, I have said in what manner its stimulant power in the fauces may be managed for the cure of hoarseness, Received into the stomach, it stimulates this, and promotes digestion, and therefore is properly employed as a condiment with our animal food. If it be infused in water, and a portion of this infusion be taken with a large draught of warm water, it readily proves emetic, and may either be employed by itself to excite vomiting, or to assist the operation of other emetics.

Infused in wine, and taken into the stomach, it proves stimulant to the nervous system, and is thereby useful in palsy ; and if employed in large quantity, it proves heating to the whole body ; and hereby it proves often useful in chronic rheumatism, whether arising from scurvy or other causes. Bergius has given us a particular method of exhibiting this root, which is by cutting it down, without bruising, into very small pieces ; and these, if swallowed without chewing, may be taken down in large quantity, to that of a table spoonful ; and the author alleges, that in this way, taken every morning, for a month together, this root has been extremely useful in arthritic cases ; which,

however, I suppose to have been of the chronic rheumatic kind.

It would seem, that in this manner employed, analagous to the use of unbruised mustard-seed, it gives out in the stomach its subtle volatile parts, that stimulate considerably without inflaming. The matter of horse-radish, like the same matter of the other, siliquose plants, carried into the blood-vessels, passes readily to the kidneys, and proves a powerful diuretic, and is therefore useful in dropsy ; and we need not say, that in this manner, by promoting both urine and perspiration, it has been long known as one of the most powerful antiscorbutics.

Sinapis.

Mustard.—The seeds of this are the part only employed ; and it has been common, for the purpose of medicine, to distinguish two kinds of it, the *Sinapis Nigra* and the *Sinapis Alba* : which, though they seem to be different species, hardly differ in their sensible qualities, and for every purpose may be indifferently used.

This seed contains a volatile part very pungent to the smell and taste. Treated by distillation with water, it gives out an essential oil, which discovers the same acrimony that is found in the whole substance, and shews that the acrimony of this depends upon that. The same substance contains also a portion of mild oil, which may be obtained by expression from the powdered seed : and when this is done, the acrid and active parts are found in the paste that remains after the expression of the mild oil.

In these seeds there is a large portion of farinaceous matter, capable of fermentation, under which the volatile oil is more evolved, and shews its activity more readily ; hence

it is that the fresh powder shews little pungency, and a good deal of bitterness; whereas, when it has been moistened with vinegar, and set by for a day, it becomes considerably more acrid, as is well known to those who prepare mustard for the use of the table. This applies also particularly to its external use. Mustard, any how moistened and applied to the skin, will become in time rubefacient and blistering; but as prepared for the table, it is more immediately active than the fresh powder; and therefore we have done improperly in ordering the fresh powdered mustard in our sinapisms, as the table-mustard would be much more quickly effectual.

Mustard thus applied externally, has all the powers of the horse-radish mentioned in the last article; and I am much surprised that the learned Professor Murray should assert, that mustard stimulates the system less than the ordinary vesicatories; that is, as I suppose, than cantharides; but to me the business seems quite otherwise. Mustard, in its powdered state, taken internally, has all the powers and effects of the other siliculosæ; but they are here more active and powerful than in almost any other, except it may be the *raphanus rusticus* last treated of.

A practice, so far as I can learn, first begun in this city, about fifty years ago, has been since very frequent. It consists in giving the mustard-seed entire and unbruised, to the quantity of half an ounce, or as much as an ordinary table-spoon will contain. This does not prove heating in the stomach; but stimulates the intestinal canal, and commonly proves laxative, or at least supports the usual daily excretion.

The following is an excellent formula:

R. Sinap. sem. contus.—Raphan. rust. incis. aa, dr. 6.—
Aq. fervent. lb. 1.—Macerate in vase operto et liquorem cola,

cui addantur spir. pimento, unc. 2.—Sumantur coch. larg. 3, bis terve indies.

That is, take of bruised mustard seeds.—Sliced horse-radish, equal quantities, six drachms.—Boiling water, a pint.—Macerate in a close vessel, and strain off.—To which add six ounces of pimento.—Let three table-spoonfuls be taken twice or thrice a day.

Allium Sativum.

The medicinal qualities of garlic are very considerable; and I take notice of them first, as they are externally applied. Garlic bruised and applied to the skin readily inflames it; and applied for some time will raise a blister, as we have said of mustard and horse-radish; but the effects of the blistering are not so permanent nor so slow in healing from the garlic as from the siliculosæ. It may, however, be a question, whether the very diffusable nature of the garlic may not in some cases give a more immediate and considerable stimulus to the whole system than the siliquous substances do?

Garlic, taken into the stomach, seems to stimulate this organ and favour digestion, and may therefore be considered as an useful condiment for our food: but both its odour and taste are so disagreeable to many persons, that in many cases they are inadmissible; but, as in warm climates, it is said to be much milder, both in smell and taste, it may in these be more frequently and largely employed.

Even in its most acrid state, it is admitted into many of our sauces in small proportion. Its diffusable odour is very readily and largely communicated to the air of the stomach; and therefore affects not only the eructations, but

even the ordinary exhalations, pretty constantly arising from that organ. It is thereby often disagreeable to the persons who have eaten it, and more so still to bystanders ; but all this may be somewhat corrected by some volatile aromatics which have been at the same time taken in, or brandy.

Its stimulus is more readily and quickly diffused over the system than that of almost any other substance known. It not only affects the perspiration and secretion of urine, but seems to pervade every vessel of the system ; and Bennett's account of its effects appearing so suddenly in issues, is a strong proof of this. By its stimulus being thus diffusible and powerful, it certainly may be useful in many diseases ; as wherever there is a languor of the circulation in any part, or wherever there are interrupted secretions. Accordingly, its diaphoretic and diuretic powers have been often useful in dropsy. Dr. Sydenham found some dropsies cured by garlic alone.

As taken in any manner, and even as externally applied, it so readily appears in the vapour arising from the lungs, there can be no doubt of its promoting the secretions, and therefore the exhalations, from that organ. Its use therefore, in pituitous asthma, and even in spasmodic asthma requiring expectoration, will be readily admitted ; and I am ready to allow what has been asserted, that even in its external application to the soles of the feet, it has been useful in those diseases.

Bergius takes notice of a particular virtue of garlic in the cure of deafness ; and I am ready to believe it, as I have myself, several times, found the use of onion in such cases very useful. Bergius's manner of using the garlic it will be proper to give in his own words : " In chronic deafness advantage is often derived by immersing an end of silk in the juice of garlic, and this is to be introduced into the ear

at different intervals during the day. The meatus auditorius thence inflames, and becomes painful for a day or two, suppurates, and desquematates, hearing at this period often returning."

Garlic, as a medicine, is employed in different forms. Sometimes the cloves dipped in oil, are swallowed entire; and in this way a number of cloves may be taken at the same time, without proving warm on the stomach, though manifestly acting on the system as diuretic and otherwise: This I take to be the administration of Bergius in the cure of intermittents. For persons who cannot swallow the entire cloves, they are cut down, without bruising, into small pieces; and in this way a considerable quantity, if swallowed without being chewed, may be taken at once, and without proving very warm in the stomach, although it be found to be an active medicine. When the garlic cannot, in any of these ways, be taken in a somewhat entire state, it is to be bruised; and, with powders coinciding with the intention of the garlic; the whole is made into pills; but it is not a very proper formula for long keeping, as the active parts of the garlic are readily dissipated by drying. These active parts are more certainly preserved by infusing the bruised garlic in warm water, and after a due infusion making the liquor into a syrup or oxymel, in the manner of the London Dispensatory. In this form the garlic is considerably powerful; but cannot be taken in any considerable quantity, without irritating the fauces, and even the stomach.

Scilla.

This is a root which from the most ancient times has been celebrated as a diuretic; and, under a proper management, it seldom fails to operate more or less as such.

It has not, however, any specific power, as it seems to be universally stimulant with respect to every sensible part or excretory to which it is applied. It readily stimulates the stomach, and proves emetic, as we often observe, and it operates powerfully. When it is so managed as to pass the stomach, it stimulates the intestines, and proves purgative; and when carried into the mass of blood, it is generally, and I believe justly, supposed to stimulate the mucous glands of the lungs, and to prove an expectorant.

When it is thus so generally stimulant, we can readily understand why it should prove a diuretic, and I would add, that probably it has something in the nature of the acrimony it contains, that suits it to be taken up by the serosity, and thereby to pass readily by the kidneys, where its acrimony therefore increases the secretion.

This actually happens, and has rendered it at all times noted as a diuretic.

This effect, however, does not always happen; because, if it be thrown into the stomach in such quantity as to prove emetic or purgative, it is thereby prevented from reaching the blood-vessels and kidneys; and therefore to obtain its diuretic effects, we must avoid its emetic and purgative operations, which may commonly be done by giving the squills, in small doses, to be repeated after proper intervals only; and I have found, that by accompanying the squills with an opiate, the emetic and purgative operation of it may be avoided, and thereby it may be carried more entirely to the kidneys.

A certain writer has alleged, that the diuretic effects of the squill is not to be expected, unless it shews some operation on the stomach. This may perhaps be founded; but I understand it no other ways than that some operation

on the stomach is a test, and a necessary test, of the squills being in an active state; in the same manner as we are only certain of the activity of mercurial preparations when they have shewn some effect in the mouth.

I have often observed, that when the squill operates strongly in the stomach and intestines, that the diuretic effects were less ready to happen; and therefore, as the squill contains an acrimony that is in part very volatile, and which is most ready to act on the stomach, that therefore the fresh squill, by acting more upon the stomach, is less certainly carried to the kidneys than when their volatile part is in some measure dissipated.

It is on this account that the dried squill is more frequently employed than the fresh. We must not, however, fail to observe here, that the drying of the squill is a business that requires much attention, as it may readily be overdone, and thereby render the squill entirely useless: and it is to be observed also, that the squill may not only be rendered inert by the first drying being too much, but that the dry powder, if kept long in a dry air, may also in time lose much of its power.

This overdrying of the squill, in one way or other, happens more frequently than our apothecaries are aware of; and has led me to allow, that some operation on the stomach, some nausea excited by the squill, is a necessary test of the activity of the portion employed.

When the squill is in good condition, to avoid its operation on the stomach and intestines, I have said it is proper to give it in small doses, to be repeated after long intervals only; but it is proper to observe here, that when the disease requires a repetition, the doses of the squill, as they are repeated, may be gradually increased, and the intervals of their exhibition made shorter; and when they come to

be tolerably large, it is then that an opiate may be conveniently employed in directing the operation of the squill more certainly to the kidneys.

In the cases of dropsy ; that is, when there is an effusion of water into the cavities, and therefore that less water goes to the kidneys, we are of opinion that a neutral salt accompanying the squill may be of use in determining this more certainly to the kidneys ; and whenever it can be perceived that it takes this course, we are persuaded that it will also be always useful, and generally safe, during the exhibition of the squills, to increase the usual quantity of drink.

It may be a question, whether the diuretic operation of squills may not be assisted by some mercurial preparation given at the same time ? and when there is any appearance of the medicine going to the kidneys, it cannot be doubted that the mercury, as stimulant of every excretory to which it is applied, may here also be useful. Accordingly it has been a frequent practice to join mercury with squills ; but I doubt much if the common practice of employing calomel on this occasion be proper. Calomel determines the squill more certainly to operate by stool ; and unless the cure of the disease is trusted entirely to purging, the calomel may readily prevent the diuretic operation of the squill. We have therefore been of opinion that the less purgative preparations of mercury were better suited to the purpose ; and we are disposed to judge that the solution of the corrosive sublimate, which so often by itself goes to the kidneys, may be more proper than any other.

The following are excellent formulæ :

R. Scill. recent. exsiccata. pulv. gr. 4.—Potas. supetartrat. pulv. scr. 1.—Ft. pulv. nocte manequē sumend. ex seri lactis poculo.

That is, take of fresh squills dried in powder. four grains.

—Crystals of tartar, one scruple.—Make into a powder to be taken night and morning in a cup of whey.

R. Cons. scillæ. dr. $\frac{1}{2}$.—Hydr. submuriat. gr. 2.—Opii purif. gr. $\frac{1}{2}$.—Ft. Bolus horâ somni sumend.

That is, take conserve of squills, half a drachm.—Calomel, two grains.—Purified opium, half a grain.—For a bolus to be taken at bed time.

R. Pill. scillæ. gr. 10.—Pill. Hydrarg. gr. 5.—Ft. pil. 3, omni nocte sumend.

That is, take of squill pill, ten grains.—Mercury pill, five grains.—To be made into three pills, to be taken every night.

The above formulæ are often employed in dropsy.

R. Ammoniac gum. pulv. scill. recent. aa, dr. $\frac{1}{2}$.—Ft. pil. 12. Sumant. tres, bis terve quotidie.

That is, take of gum ammoniac, fresh squills, equal quantities.—Make into 12 pills, three of which are to be taken twice or thrice a day.

R. Mist. ammoniac. unc. 5.—Oxymel scill.—Tinct. opii camphor. aa, unc. $\frac{1}{2}$.—Capt. coch. duo. sexta quâque horâ.

That is, take of milk of ammoniac, five ounces.—Oxymel of squills.—Camphorated tincture of opium, of each half an ounce.—Two table-spoonfuls are to be taken every six hours.

The three last formulæ are employed to relieve difficult respiration.

Sales Alkalini.

It is not necessary to observe, that the volatile alkaline salts were formerly drawn from various animal substances, and supposed in consequence to have peculiar virtues: but now the chemists have learned, that from whatever sub-

stances they may be extracted, they may be brought to such a degree of purity as renders them hardly different from one another. They are still however prepared in two different ways; the one of which is from sal ammoniac, which gives the ammonia of the London Dispensatory, or the sal ammoniacus volatilis and spiritus salis ammoniaci of the Edinburgh.

These are certainly the purest forms of the volatile alkali, the most free from any adhering animal substances; but while the trade continues preparing a volatile alkali from the bones or other solid parts of animals, there will come into our shops a salt and spirit that can hardly ever be so pure from some empyreumatic animal substance adhering; and it is a question with me, whether such an adherence may not give some peculiar quality to the salt and spirit. I believe it does so, and may render it more antispasmodic. This indeed cannot go far in any doses of the salt or spirits given to adults; but it may go much further as employed in the spasmodic affections of infants.

The liquid volatile alkali is commonly employed in its mild state; but by a distillation of the sal ammoniac with quick-lime, the alkali obtained may be in its caustic state. In this state it may be readily joined with spirit of wine, and gives the spiritus salis ammoniaci dulcis of the Edinburgh Dispensatory, or the spiritus salis ammoniaci vinosus of the London. The combination affords an excellent menstruum for dissolving the several fetid substances employed as antispasmodics, and renders them more suddenly diffusible, and perhaps of more effect, in all spasmodic affections.

The caustic volatile alkali is seldom employed by itself; but if its acrimony be covered while it passes the mouth and fauces, it may be employed with great safety. Its chief use, however, is when employed externally; and when

smelled at the nose, gives a more powerful stimulus than the mild alkali can do. Its acrimony is so considerable, that when applied to the skin, it readily irritates, and even inflames it; and may be so managed as to prove an useful stimulant and rubefacient in many cases. But this requires its being blended with a mild expressed oil, in such proportion as to prevent its inflaming too much; and in this state it may be employed with great advantage, and particularly in paralytic cases, with more advantage than the acids we mentioned before for that purpose.

Practitioners are now well acquainted with the use of this combination, under the name of the Volatile Oil, and find it useful in relieving all pains arising from rheumatism, when the skin is not already affected with redness; and it is even useful in relieving pains of the flatulent kind. This combination, to be very useful, requires to be made of one drachm of good caustic alkali to an ounce of the oil; and it may even go frequently with advantage to double that quantity. Let apothecaries observe, that if the alkali does not entirely and intimately unite with the oil, and remain constantly united with it, it is a mark that the alkali was not sufficiently caustic.

The following are the best formulæ:

R. Ammon. subcarbon. gr. 6.—Tinct. cardom. com. dr. 1.—Aq. pulv. dr. 11.—Syr. cort. aur. dr. 1.—Ft. haustus, sextâ quâvis horâ capiendus.

That is, take of prepared ammonia, six grains.—Compound tincture of cardamon, one drachm.—Penny royal water, ten drachms.—Syrup of orange peel, one drachm.—For a draught to be taken every four hours.

R. Spir. ammon. succin. gtt. 20.—Mixt. camphor. dr. 11.—Spir. lavend. comp. dr. 1.—F. Haustus bis terve quotidie sumendus.

That is, take of succinnated spirit of ammonia, twenty

drops.—Camphorated mixture, eleven drachms.—Compound spirit of lavender, one drachm.—For a draught to be taken twice or thrice a day.

R. Spir. ammon. comp.—Spir. lavend. comp.—Tinct. castor. aa, unc. 1.—Cap. coch. parvulum, ex pauxillo aquæ fontanæ sub languore.

Compound spirit of ammoniac.—Compound spirit of lavender.—Tincture of castor, equal quantities, an ounce. Take a tea-spoonful in some water whenever extremely low.

R. Liq. volat. corn. cerv. gtt. 20.—Tinct. calumb. dr. 1.—Aq. cinnam.—Aq. distillat. aa, dr. 6.—F. haustus horâ xi. matutin. et horâ vii. vespere, quotidie sumendus.

That is, take of volatile liquor of hartshorn, twenty drops.—Tincture columb. one drachm.—Cinnamon water, Distilled water, of each, six drachms.—For a draught to be taken at eleven and at seven every day.

R. Ammon. muriat. pulv. scr. 2.—Spir. piment. unc. 1.—Aq. distillat. unc. 4½.—Syr. suc. limon. unc. ½.—Capt. coch. larg. 3. ter in dies.

That is, take of sal ammoniac in powder, two scruples. Spirit of pimento, one ounce.—Distilled water, four ounces and a half.—Syrup of lemon juice, half an ounce.—Take three table-spoonfuls three times a day.

R. Aq. ammon. acetat. unc. 1.—Spir. rect. unc. 2.—Ft. embrocatio.

That is, take of acetated water of ammonia, six ounces —Rectified spirits of wine, two ounces.—For an embrocation.

Pinus.

Turpentine in its entire state is an acrid substance, and when applied to the skin inflames it to a considerable

degree. It might perhaps by itself be an useful rubefacient, but when we would prevent its operation from going too far, it is not easy to wash it off the skin. When it was employed in the emplastrum volatile of the former editions of the Edinburgh Dispensatory, it proved a very powerful rubefacient, more powerful than that of the volatile alkali combined with expressed oils. The Canada, and other balsams, have the same virtues, when taken internally. They are usually employed in fluor and choloris and seminal weaknesses.

The formulæ are:

R. Balsam. Canad. dr. 3.—Vitel. ovi. q. s.—Probé subactis, admisce sensim, mel. despumat. dr. 3.—Aq. cinnam. unc. 3.—Sumat æger, quolibet quadrihorio, cochleare unum: semper autem ante usum concutiatur phiala.

That is, take of the Canada balsam, three drachms.—The white of an egg, as much as is sufficient. After these are intimately united, add clarified honey three drachms, cinnamon water, three ounces. Let the sick person take a large table-spoonful every four hours, shaking the bottle first before using it.

R. Bals. copaib.—Spir. rectific. aa, dr. 4.—Capt. gtt. 40, ter in die ex lactis novi cyatho.

That is, take of balsam of copaiva and rectified spirit of wine equal parts, four drachms. Forty drops are to be taken three times a day in a cup of new milk.

R. Bals. copaib.—Oliban. in pulv. trit. aa, dr. 2.—Cons. cynosbat. unc. $\frac{1}{2}$.—Ft. Elect. de quo, bis terve in die, ad nucis moschatae magnitudinem capiatur.

That is, take of balsam of copaiva and olibanum reduced to powder, of each two drachms, conserve of hips, half an ounce, make into an electuary, of which take the size of a nutmeg twice or thrice a day.

R. Bals. Peruv. dr. 2.—Ol. amygdal. unc. 1. Syr. alth.

unc. $\frac{1}{2}$.—Vitell. ovi unius.—Bene terantur simul, dein sensim admiscentur, aq. font. unc. 6.—Capiat bis die unciam unam.

That is, take of balsam of Peru, two drachms, oil of almonds, one ounce, syrup of marsh-mallows, half an ounce, the white of one egg. Let these be well mixed together, when gradually add six ounces of water.—One ounce is to be taken twice a day.

Juniperus.

It contains, minutely diffused through its whole substance, an essential oil very much the same with that of turpentine, only of a more agreeable odour. It is manifestly diuretic, and imbues the urine with the same violet smell that the turpentine do.

The part of juniper chiefly employed in medicine is the berry; which, especially as produced in somewhat warmer climates than ours, contains, diffused over their whole substance, particularly in their seeds, the essential oil I have mentioned in larger quantity. In the common employment of the juniper berries, unless pains are taken, by a strong contusion, to break these seeds, the infusion is an agreeable, but a weak, impregnation; and therefore of very little power as a medicine.

When spirit of wine is applied to these seeds, it extracts the essential oil from the husk, pulp, and bruised seeds very entirely, and carries them over with it in distillation. By this it proves a diuretic, but to my observation never a very powerful one; and when largely used, proves more hurtful by the menstruum than useful by the diuretic quality of the impregnation. To many persons, especially after the repeated use of it, the proper odour of the juniper berries is sufficiently agreeable; but to others it must be

rendered so by the addition of some other aromatics, as in the aqua juniperi composita.

R. Bac. junip. contus. unc. 2.—Aq. fervent. lb. 1.—Macerate et liquor. colat. adde spir. piment. unc. 2.—Cap. coch. larg. 3. ter quaterve indies.

That is, take of juniper berries bruised, two ounces, boiling water a pint. Macerate and strain off, and add to the strained liquor two ounces of spirit of pimento.—Take three large table-spoonfuls three or four times a day.

Moschus.

The natural history of the animal producing this peculiar substance I must leave to others, as it is of no consequence to our purpose to determine, whether it be of the goat or of the hart kind. I would wish to enter into its chemical history; but the chemists have not gone far on this subject. It is a remarkably odoriferous substance; and this seems to depend upon what may be called an essential oil, as it arises with distillation in water.

Its medicinal property I consider as entirely depending upon its being a very odoriferous matter, which in all cases seems to be powerful in acting upon the nerves of the human body. As, however, we do not yet know any certain means of extracting its odoriferous parts; so the first thing to be remarked with respect to its medicinal qualities is, that it is more effectual given in substance than under any preparation that has been attempted. In substance it is to be given in large doses, from ten to thirty grains; and even when these large doses are found to be effectual, they must be repeated after no long intervals till the disease is entirely overcome.

While I am mentioning the doses of musk, it is proper to remark, that these will depend upon the quality of it,

which is at different times in very different conditions. Whether this is owing, as has been alleged, to a more imperfect condition in the original musk, or to an adulteration frequently practised upon it, I cannot certainly determine ; but certainly such differences do occur, and I have therefore very often found it to be an ineffectual medicine. I judge of it always by the strength of its odour, and in proportion to this only to be an effectual remedy. I was once called to a patient in the night-time, under violent head-ache and delirium arising from gout, for which I ordered fifteen grains of musk, but without giving my patient any relief. In the morning, however, the disease continuing the same, as I had learned where some good and genuine musk was to be had, I ordered a like dose of this, and thereby obtained the immediate relief of my patient. From many such instances of the difference of musk, I must inculcate upon all practitioners, that genuine musk is a very powerful medicine, and that they should not doubt of its efficacy, on any occasion, without their being certain that the failure was not owing to the imperfect state of the drug. I must add, that the imperfect state of musk is not compensated by a larger dose.

With such precaution in the choice of it, I maintain that musk is one of the most powerful antispasmodics that we are acquainted with. I have found it, with Dr. Wall, to be a powerful remedy in many convulsive and spasmodic affections, and in some of a very peculiar kind. I had once a gentleman affected with a spasm of the pharynx, preventing deglutition and almost respiration. This, when other remedies had failed, was relieved by the use of musk, which often shewed its power, for the disease continued to recur at times for some years after, and was only obviated or relieved by the use of the musk.

In another disease I can vouch for the powers of musk,

and that is in several circumstances of the gout. The case given by Mr. Pringle, in the *Physical and Literary Essay*, Vol. II. Art. 12, are very much in favour of its virtues : and in several instances of the gout attacking the stomach, I have found it relieved by large doses of musk. I gave above an instance of head-ache and delirium, arising from the gout, being cured by it ; and in the same person I had repeated instances of its power. This person being frequently affected with the gout, was liable to have it retrocedent, and affecting the stomach, the lungs, and particularly the head, in the manner above-mentioned ; and in many of these instances it was very suddenly relieved by large doses of musk, or by these at least repeated after short intervals ; though at length the great irregularities of this patient brought the disease into a state that resisted all remedies.

It seems to be adapted to these cases of convulsive disorder which I have said above are to be cured by opiates ; and indeed the success which I have generally had with these has prevented my having further experience of the musk.

Vide the next article for the formulæ.

Castoreum.

This also is an animal production, the natural history of which the public are well acquainted with. It is a pretty strongly odoriferous substance, of the disagreeable kind ; and to this we ascribe its medicinal powers. It is certainly on many occasions a powerful antispasmodic, and has been useful almost in every case requiring such remedies, especially when given in substance, and in large doses, from ten to thirty grains. It has been supposed by some to have somewhat of a narcotic power ; but I have never

perceived this, excepting where such effects might be imputed to its removing the spasmodic affections which interrupted sleep. Its medicinal virtues are best extracted by a rectified spirit, as it is probable that this extracts most powerfully the odoriferous oil, upon which the medicinal quality probably depends.

The Edinburgh College are of this opinion; but the London College prefer a proof-spirit. The latter may give a medicine to be employed more conveniently in a larger dose than the former; but neither of them, in my opinion, can admit of doses of much efficacy. Either of them may give a medicine to be suddenly diffused, and therefore of use in spasmodic affections: but if that is the intention of the practitioner, it will be most certainly obtained by employing the compound tincture of castor, as prescribed by the Edinburgh College.

R. Mist. moschat.—Dosis cochl. 3, sexta quâque horâ.

Musk mixture.—The dose is three table-spoonfuls every six hours.

R. Mosch.—Castor. aa. scr. 1.—Ft. boli numero duo, quorum alter mane, alter vaspere sumatur, ex mist. camphor. unc. 2.

That is, take of musk.—Castor, of each a scruple.—Conserve of hips, one drachm.—Make into two bolusses, one of which is to be taken in the morning, and another in the evening, in two ounces of camphorated mixture.

Assafœtida,

This when in a tolerably recent and genuine state, is a most valuable medicine. This depends upon the force of its odour, and upon that odour's being of a very diffusible kind, and which I believe therefore penetrates the nerves more readily than any other vegetable odour. All this

explains its being a powerful and suddenly operating antispasmodic. Accordingly I have found it to be the most powerful in all hysteric cases; and when the presence of any hysteric paroxysm prevented medicines being taken by the mouth, I have found it given in glysters, to be very effectual. When taken into the stomach it is particularly useful in relieving those spasmodic complaints which so frequently attend dyspepsia; and as it has manifestly a laxative power, it is well suited to relieve the flatulent colics of hysteric and hypochondriac persons.

It is in some measure suited to relieve the spasmodic asthma; but as the spasm in these cases is of an obstinate kind, I have seldom found the asafœtida of much service in asthmatic paroxysms.

As all the foetid gums seem to be determined to the lungs, and to promote expectoration; so I have found the asafœtida the most powerful for this purpose, and more powerful than the ammoniac so frequently employed.

The asafœtida is employed in various forms, as it may be given in its solid form, or may be extracted by either watery or spirituous menstruums, and especially as its virtues rise in distillation with those of the latter kind.

In a solid form it seldom acts as a powerful antispasmodic; and therefore, excepting where it is to be joined with aloes or other medicines, I seldom employ it in this state.

When it is to be employed as an antispasmodic, and especially where a sudden operation is required, the form of tincture or volatile spirit are the most proper. As the frequent repetition of the same antispasmodic is ready to weaken its powers, so some variety of formulæ, and of combination with other antispasmodics, may be necessary.

For the purposes just now mentioned, I hold the spiritus volatilis fœtidus of the Edinburgh College, or the spiritus

ammoniæ foetidus of the London, when they can be conveniently given in large doses, to be the most powerful formulæ; but much of all this must be left to the discretion of practitioners.

Pil. galban. comp.—Dosis a granis decem ad scrupulum unum bis quotidie.

Compound Galbanum pill.

The dose is from ten grains to a scruple twice a day.

R. Mist. assæfoetid. unc. $5\frac{1}{2}$.—Spir. lavend. comp. unc. $\frac{1}{2}$.—Spir. ammon. comp. dr. 2.—Sumant. ter quotidie coch. tria.

That is, take of milk of assafœtida, five ounces and a half.—Compound spirit of lavender, half an ounce —Compound spirit of ammoniac, two drachms.—Take three table-spoonfuls three times a day.

Valeriana Sylvestris.

This is a root of much virtue and deserved reputation. It has been almost at all times in esteem, but particularly since the time of Fabius Columna. In the condition we have it, in different shops and at different times, I have found the sensible qualities of it to be very different; and I am persuaded, that unless it is taken up at a proper season, and properly preserved, it is often a very inert substance.

I do not conclude from its singular powers with respect to cats, that it must have peculiar powers with respect to the animal œconomy; but I consider its more or less activity with respect to cats, which is different at different times, to be a test of its active powers in general.

Its antispasmodic powers in general are very well established, and I trust to many of the reports that have been given of its efficacy; and if it has sometimes failed, I have just now accounted for it, adding only this, that it seems

to me, in almost all cases, that it should be given in larger doses than is commonly done. On this footing, I have frequently found it useful in epileptic, hysteric, and other spasmodic affections. It seems to be most useful when given in substance; and in large doses I have never found much benefit from the infusion in water.

The London College have attempted a tincture strongly impregnated; and I have attempted one still stronger, by taking the root in double the quantity, and straining the tincture by a strong expression: and this, I have found, in persons who cannot bear a large dose of the menstruum, is a powerful remedy, and suddenly operating. The volatile tincture prescribed by both colleges, is often, as suddenly operating, an effectual remedy, and gives an excellent variety of antispasmodic formulæ; but whatever may be the efficacy of the valerian, the menstruum here has certainly a share in it.

Tinct. valer. ammon.—Dosis a drachmâ unâ ad uncia dimidium ter quotidie, ex cyath. aq. menth. pip.

That is, take of ammoniated tincture of valerian.—The dose from one to four drachms three times a day in a cup of peppermint water.

R. Valerian. pulv. unc. 1.—Syr. aur. cort. q. s.—Ft. elect. cujus detur coch. min. unum vel alterum, ter indies, ex aliquot uncis aq. pulegii.

That is, take of powder of valerian, one ounce.—Syrup of orange peel, as much as is sufficient.—Make an electuary, of which a small tea spoonful or two is to be taken three times a day in some peppermint water.

R. Valerian. pulv. dr. 2.—Pulv. cinnam. comp. dr. $\frac{1}{2}$.—Spir. ammon. comp. dr. 1.—Aq. cinnam. unc. 4.—Aq. menth. pip. unc. $3\frac{1}{2}$.—Ft. Mist. cap. coch. larg. 2 ter. quaterve, indies.

That is, take of powder of valerian, two drachms.—

Aromatic powder, half a drachm.—Compound spirit of ammonia, one drachm, cinnamon water, four ounces.—Peppermint water, three ounces and a half.—For a mixture. Take two large table-spoonfuls three or four times a day.

Myrrha.

Myrrh.—This is a gummy resin, which has long been considered as a valuable medicine, and seems intitled to some esteem by its sensible qualities, and by the acrid matter that a chemical examination shews it to contain.

Its proper virtues, however, seem to me to have been mistaken. It manifestly stimulates the stomach, and, when taken in a moderate quantity, promotes appetite and digestion; but taken in larger quantity, as in half a drachm or two scruples for a dose, it raises a disagreeable sensation of heat in the stomach, and at the same time occasions a frequency of pulse and a sense of heat over the whole body. From this power, it may sometimes be useful in that flaccidity of the system which is so often connected with a retention of the menses; but we cannot perceive that it has any peculiar power of determining to the uterine vessels, and therefore that it has not any title to be supposed, as it has usually been, an emmenagogue. By its sensible qualities, it has not even so much pretension to an antispasmodic as the foetid gums.

R. *Myrrh. pulv. scr. 1.*—*Potas. gr. 3.*—*Cons. cort. aur. scr. 1.*—*Syr. simp. q. s.*—*Ft. bolus ter in die sumend.*

That is, take of powdered myrrh, one scruple.—Prepared kali, three grains.—Conserve of orange peel, one scruple.—Simple syrup, as much as is sufficient.—Make into a bolus, to be taken three times a day.

Myrrh. pulv.—Cetacei. aa, gr. 15.—Syr. tolut. q. s.—Ft. bolus ter indies sumend.

That is, take of powdered myrrh.—Spermaceti, of each fifteen grains.—Syrup of Tolu, as much as is sufficient.—Make into a bolus, to be taken three times a day.

R. Myrrh. pulv. dr. 2½.—Cons. ros. rub. unc. 1.—Acid. sulphuric. dil. dr. 2.—Syr. cort. aurant. q. s.—Ft. elect. cujus ter indies detur quod nuclei fructûs myristicæ magnitudinem habeat.

That is, take of powdered myrrh, two drachms and a half.—Conserve of red roses, one ounce.—Diluted vitriolic acid, two drachms.—Syrup of orange peel, as much as is sufficient.—Make an electuary, of which the size of a nutmeg is to be taken three times a day.

These two last formulæ are chiefly employed in consumption.

Serpentaria.

The *serpentaria*, both in taste and flavour, is more agreeable than the other species, and it is by its sensible qualities of bitterness and aromatic acrimony that we can account for the virtues justly ascribed to it.

Both these qualities render it antiseptic, and powerfully tonic; and therefore suited to prevent gangrene. The same qualities will account for its cure of intermittent fevers, especially when combined with Peruvian bark and astringents.

By its aromatic acrimony it proves a powerful stimulant to the system; and therefore may be useful also in some cases of putrid fevers: but as the cure of either intermittent or continued fevers by stimulants alone is an ambiguous and dangerous practice, so in the former it is only safe

when joined with the bark ; and the use of it in continued fevers is to be employed with much caution. The common opinion of its alexipharmic powers, both with respect to it and all the others which have gone under the same title, is an incorrect and false notion, liable to much abuse, and which I have had frequent occasion to observe. The stimulant power of the serpentaria is especially situated to the low and advanced state of the typhus only, and even then it will be more safely joined with the bark than employed for its stimulant power alone. It is certainly owing to its ambiguity in its use, that it is not nearly so much employed in practice as it was some forty years ago.

R. Serpent. contus.—Contraerv. contus. aa, dr. 3.—Aq. fervent. unc. 14.—Macerate et liquor. frigefact. cola, cui adde tinct. serpent. unc. 1.—Syr. simp. unc. $\frac{1}{2}$.—Detur coch. tria, 4tâ quâque horâ.

That is, take of bruised serpentaria.—Bruised contraerva, of each three drachms.—Boiling water, fourteen ounces.—Macerate, and strain off when cold, to which add one ounce of tincture of serpentaria.—Half an ounce of simple syrup.—Let three table-spoonfuls be given every four hours.

Camphora.

Camphor.—This substance as we have it in our shops, and employ it in medicine, is obtained from a tree now sufficiently known to our botanists, and distinguished by the trivial name of *Laurus Camphora*. What we employ is chiefly the growth of Japan, though there are several other trees in the East Indies which afford the same substance. But as I do not know that the camphor obtained from these other trees is ever brought into Europe for the

purpose of medicine, or, if they are, that they differ in the least from that which we commonly employ, I do not think it necessary for me to prosecute the natural history of it further; nor is it anywise proper for me to speak of the manner in which this substance is obtained from the trees affording it; of the different states in which it is found and transmitted to Europe; or of the several operations by which it is brought into that form in which we have it in our shops.

These are particulars that may be of some curiosity with respect to chemistry and trade; but there is certainly no foreign drug so little liable to any variation or adulteration, or that comes into our hands so steadily and uniformly of the same appearance and qualities, and therefore requiring less of our acquaintance with its previous history.

With a view to its medicinal history, it may be proper to remark, that since we became acquainted with this peculiar substance from the East Indies, the chemists have supposed, that a substance precisely of the same kind was to be found in many European plants. In many instances they have supposed this without any clear proof; but they have certainly, in several instances, demonstrated its existence in the clearest manner. It does not, however, seem necessary to enter into any enumeration of those plants; because, even in the instances in which the presence of camphor is most clearly demonstrated, it is even in these in such small proportion, that it has not given any modification of their ordinary virtues, or that these substances have been employed, or can be employed as a medicine, for the purposes which camphor, in its separate state, is, or may be employed.

After setting aside so many particulars that might have entered into a treatise of camphor, it is time for me now

to come to my proper business, which is the consideration of camphor as a medicine. This I find to be a difficult task, as I must encounter the various and contradictory opinions that have been maintained with respect to it.

The opposition of opinions appears strongly from hence, that the controversy has been commonly brought into the single question, whether camphor be a heating or a cooling medicine with respect to the human body? or, as I would put it in other words, whether it is a stimulant or a sedative power? The question has been often attempted to be determined by frivolous and ill-founded theories, both on one side and the other; but these shall be here entirely neglected, as we judge the question must be absolutely determined by experiments made upon the human body, assisted however by some analogy, wherever it can be safely drawn, from experiments on brutes.

To this purpose we remark, in the first place, that camphor taken into the mouth, is of an acrid taste; and though by its evaporation, it excites a sense of cold air, what remains is a sense of heat in the mouth and fauces: and when taken down into the stomach, it often gives some pain and uneasiness, which we impute to the operation of its acrimony upon the upper orifice of that organ. These may be considered as marks of its heating quality; and the same are more strongly marked by its application to any ulcerated part, which it always evidently irritates and inflames.

The best formulæ are:

R. Mist. camphor. unc. 1.—Aq. ammon. acet. unc. $\frac{1}{2}$.—
Syr. croci. dr. $\frac{1}{2}$.—M. Ft. haustus, 6ta. quâque horâ sumend.

That is, take of camphorated mixture, an ounce.—
Water of acetated ammonia, half an ounce.—Syrup of crocus, half a drachm.—For a draught to be taken every six hours.

R. Mist. camphor. unc. $1\frac{1}{2}$.—Tinct. valer. vol. gtt. 10.—
M. Ft. haustus bis die sumend.

That is, take of camphorated mixture, an ounce and a half.—Volatile tincture of valerian, ten drops.—For a draught to be taken twice a day.

R. Mist. camphor. unc. $1\frac{1}{2}$.—Spir. ammon. fœtid. dr. 1.—
—Syr. zingib. dr. $\frac{1}{2}$.—Ft. haustus ter die sumend.

That is, take of camphorated mixture, an ounce and a half.—Fœtid spirit of ammonia, one drachm.—Syrup of ginger, half a drachm.—For a draught to be taken three times a day.

R. Camphor.—Castor.—Mosch. aa, gr. 5.—Syr. pap. alb. q. s.—Ft. bolus ter in die sumend.

These formulæ are usually employed in what are more commonly known by nervous affections.

Cascarilla.

I have been uncertain where to place this substance, whether here with the aromatics or with the astringents; and I am of opinion that the latter is its proper place. It approaches to the aromatics by its essential oil; yet its bitter, to be extracted by either water or spirit, is its most considerable part.

It was introduced into practice in the last century as a medicine of great value, both in continued and in intermittent fevers; and the Stahlans, fond of any thing as a substitute for the Peruvian bark, against which they had declared so strongly, received the cascarilla, and employed it much in practice, and have given many testimonies of its efficacy; but these testimonies have not been supported by other practitioners since; and particularly in this country we have found it a very weak substitute for the Peruvian bark. Bergius says of it, “Tamen fatendum

illum in ipsis febribus parum facere, neque tertianis vernalibus certo mederi." Our experience in this country is suitable to this; and in several trials it has entirely failed. What Bergius adds to the passage quoted, "sed in hæmoptyse sæpe prodest," is not supported by our experience; and in hemorrhagies of all kinds, it seems to be rather hurtful, as might be expected from its aromatic and bitter qualities, while it does not discover a sufficient astringent power. It may be allowed to be of tonic and stomachic virtue; but even in this way its virtues are not peculiar nor considerable: and there is no just foundation for the prejudices which the German physicians have conceived in its favour.

The following is an excellent formula:

R. Cascaril. contus. unc. $\frac{1}{2}$.—Aq. fervent. unc. 12.—Macerate per horas sex, liquorem frigefactum cola, et colatis unciis 7, adde tinct. corticis cascaril. unc. 1.—Capt. ter quaterve in dies cochlearia quatuor.

That is, take of cascarilla bruised, half an ounce.—Boiling water, twelve ounces.—Macerate for six hours, strain the liquid when cold, and add to it tincture of cascarilla an ounce.—Four table-spoonfuls are to be taken three or four times a day.

Asarum.

In large doses the *asarabacca* is very powerful and sometimes too violent; but in more moderate doses, not exceeding a few grains, and repeated for several evenings together, it may be employed to procure a pretty large watery discharge from the nose; and which sometimes continues for several days together. By this it has the general effects of errhines, and has particularly proved very useful in tooth-ache and ophthalmia.

It is properly the basis of the pulvis sternutatorius of our colleges ; but I judge the London College have added too large a proportion of other cephalic plants, which renders the dose of the chief ingredient, the asarum, by much more bulky than convenient ; and that the Edinburgh college have given a composition much more convenient for a proper exhibition. I find that three grains of asarum is a proper dose ; and that four grains of the whole powder makes a convenient snuff.

Essential Oils.

We need not mention here cinnamon and peppermint water, and the essential oils, which are only in use for covering the tastes of medicines, having but slight stimulant power.

SECT. XCIV.

TONIC STIMULANTS.

Ferrum.

Steel or Iron.—Both titles stand in the catalogue of the London College ; and in preparing the rubigo, they seem to have preferred the steel, chalybs ; but on what foundation we cannot perceive. We suppose it to be quite indifferent whether the one or the other is employed ; but if we were to give any preference, we should think it due to the iron in its soft malleable state, or in what we call Forged Iron.

As iron, like all other metals, in its solid and entire state, is not active with regard to our bodies, without being corroded or dissolved by saline matters, so we judge it to be

rendered active only by being combined with acids. It has been common enough to give the entire metal, brought by filing into a fine powder, and with very good effects, as a medicine. This, however, we do not consider as any exception to our general rule: for we are persuaded that there is constantly present in the human stomach a quantity of acid, capable of dissolving iron; and we hold this to be a proof of it, that we never knew iron given in its metallic or slightly corroded state, without producing a blackness in the stools, which to us always presumes a previous solution of the iron in acids.

As this combination with acids is necessary, so physicians and chemists have diversified this combination an hundred ways; and we do not know a preparation of iron for the purpose of medicine, that has not been prepared by a combination with acids, or by bringing the iron into a state that rendered it readily soluble by the acid of the stomach; and Dr. Lewis very properly observes, that Prussian blue, though truly containing a quantity of iron, as it is not soluble in any acid, is the least promising of all the medicinal preparations.

I do not think it necessary to enumerate here the various preparations that have formerly stood, or still stand, in our dispensatories, as they all agree in the same medical virtue, and are only proper as convenient for being exhibited in different forms. The Edinburgh College have endeavoured to make an improvement in preparing a spirituous tincture, as the tinctures of that kind formerly prepared were liable in keeping to let fall a portion of what they had dissolved, and of thereby becoming constantly weaker the longer they were kept. The Edinburgh College, as taught by Dr. Black, have now obviated this, by ordering the tincture to be made of the *squamæ ferri*.

Iron combined with acids becomes an astringent sub-

stance; and upon its astringent and tonic powers its medicinal virtues entirely depend; for by increasing the tone of the vessels it increases their vigour and activity.

We do not think it necessary here to take any notice of the doctrine of Menghini concerning the iron constantly present in the blood of animals, or the manner in which it is introduced into it. We think it is enough to say, that his experiments, both on men and brutes, show clearly that iron introduced into the stomach, and acting there, has the power of increasing appetite, and the vigour of the circulation.

Physicians formerly supposed that iron had a double power, of sometimes increasing and sometimes restraining evacuations, and fancied that different preparations possessed these different powers; but in this they were mistaken, as we have maintained above, that every preparation soluble in acids, has the same astringent and tonic power; and the Croci, which were distinguished as aperient or astringent, have commonly neither the one nor the other quality.

It is, however, still true, that the same preparation, as Dr. Lewis has judiciously observed, may sometimes exert an aperient, and sometimes an astringent power, according to the state of the body they are applied to. If, for example, a retention of menses depends upon a weakness in the vessels of the uterus, chalybeate medicines, by invigorating the force of the vessels, may cure the disease, and may thereby appear to be aperient; and, on the contrary, in a menorrhagia, when the disease depends upon a laxity of the extreme vessels of the uterus, iron exhibited, by restoring the tone of these vessels, may shew an astringent operation.

By considerations of this kind, the inutility or propriety of the medicinal preparations of iron may be determined.

in cases of a general flaccidity, as it is frequently marked under the title of Cachexy, and in all cases of evacuations from laxity, whether sanguine or serous, they are likely to be the most effectual remedies.

We are persuaded that the good effects of the preparations of iron have been often missed by their being given in too small doses. The saline preparations, in large doses, are ready to irritate the stomach; and both on this account, and on some other considerations, it may be always proper to begin with small doses, and to increase them by degrees; but we have often found, that no great benefit is to be obtained but when large quantities, either by the size of the doses, or by the long continuance of them, have been thrown in. We have found the simple rust as effectual as any other preparation, and we have always seen the stomach bear it better than any other. We begin with a dose of five grains, but increase it gradually to what the stomach easily bears. I think the stomach commonly bears it better by some aromatic being joined with it.

The following are the best formulæ:

R. Fer. sulphat.—Extract. cinchon. aa, dr. $\frac{1}{2}$.—F. pil. 20.
—Capt. pil. 1. horâ xi. matutin. et horâ vi. vespere sing. diebus.

That is, take of vitriolated iron.—Extract of bark; equal parts, half a drachm.—Make into 20 pills. Take one at eleven in the forenoon, and at six in the evening, every day.

R. Ferri ammoniac. gr. 5, vel ferri vitriolat. gr. 3.—Pulv. myrrh. comp. gr. 15.—Bene simul terantur, et syrupo zingiberis fiat bolus bis in die sumendus.

That is, take of ammoniacal iron, five grains, or vitriolated iron, three grains.—Compound powder of myrrh, fifteen grains.—Rub them well together, and with syrup of ginger make a bolus, to be taken twice a day.

R. Fer. sulphat. pulv. gr. 12.—Extr. gentian. dr. 2.—Ol. essentielle. menth. pip. gtt. 6.—Simul contunde, et massam in pilulas 30 divide; quarum tres vel quatuor bis in die sumantur, ex poculo infusi florum chamæmeli.

That is, take of vitriolated iron in powder, twelve grains.—Extract of gentian, two drachms.—Essential oil of peppermint, six drops.—Pound them together, and divide the mass into thirty pills, of which three or four are to be taken twice a day, in a cup of infusion of chamomile flowers.

R. Fer. sulphat. gr. 2.—Quassia, gr. 3.—Rhei, zingib. aa, gr. 4.—Mucil. acac. gum. q. s.—F. bolus bis die sumend.

That is, take of vitriolated iron, two grains.—Quassia, three grains.—Rhubarb and ginger in powder, of each, four grains.—Mucilage of gum arabic, as much as is sufficient.—Make into a bolus to be taken twice a day.

R. Ferr. sulphat.—Extract. gentian.—Rhei pulv. aa, gr. 10.—Myrrh. pulv. scr. 1½.—Syr. zingib. q. s.—F. pil. 20, quarum cap. 2, horâ xi. matutin. et horâ vi. vespere sing. diebus.

That is, take of vitriolated iron.—Extract of gentian.—Powdered rhubarb, of each ten grains.—Powdered myrrh, a scruple and a half.—Make 20 pills, of which take 2 at eleven, and at six, every day.

R. Tinct. fer. muriat. dr. 4.—Spirit. cinnam. unc. 1½.—Cap. coch. minimum unum vel alterum, bis in die, ex aquæ puræ tepidæ cyathis.

That is, take of tincture of muriated iron, four drachms.—Spirit of cinnamon, an ounce and a half.—Take one or two tea-spoonfuls twice a day, in a cup of pure warm water.

R. Ferr. sulphat. gr. 12.—Potas. subcarbonat. dr. ½.—Myrrh. pulv. aa. dr. 1.—Acac. gum. mucil. dr. 2.—De-

coct. glycyrr. rad. unc. $6\frac{1}{2}$.—Spirit. piment. unc. 1.—Tere myrrham et ferri cum potassa et mucilagine, donec. perfecte commisceantur, dein adde reliqua. Dosis uncia una, bis terve sing. diebus.

That is, take of vitriolated iron, twelve grains.—Prepared kali, half a drachm.—Powder of myrrh, one drachm.—Mucilage of gum arabic, two drachms.—Decoction of liquorice root, six ounces and a half.—Spirit of pimento, an ounce.—Rub the myrrh and vitriolated iron with the kali and mucilage, until they perfectly unite, then add the other ingredients. The dose is an ounce, twice or three times a day.

R. Ferri sulphat. gr. 12.—Myrrh. in pulv. trit. ser. 2.—Bene conterantur, et gradatim adde aq. potas. subcarbonat. gtt. 25, at ft. massa in pil. 12 æquales dividenda; harum sumantur duæ ter quotidie.

That is, take of vitriolated iron, twelve grains.—Myrrh in powder, two scruples.—Rub them well together, and gradually add water of prepared kali, twenty-five drops, so as to make a mass to be divided into twelve equal pills, of which two are to be taken three times a day.

R. Ferri rubig. pulv dr. $1\frac{1}{2}$.—Cinchon. pulv. unc. 1.—Anthem. nobilis flor. pulv. unc. $\frac{1}{2}$.—Syr. cort. aur. q. s.—Ft. elect. de quo sumat nuclei fructûs myristicæ instar, ter quotidie.

That is, take of rust of iron, a drachm and a half.—Bark powder, an ounce.—Camomile flowers in powder, half an ounce.—Syrup of orange peel, as much as is sufficient.—Make into an electuary, of which the size of a nutmeg is to be taken three times a day.

R. Ferr. rubigin. vel ferr. tartarisat. dr. 2.—Cons. absinth. maritim. vel cons. aurant. cort. unc. $1\frac{1}{2}$.—F. Elect. cap. coch. minutem, ex tantillo vini rubri lusitanici bis in die.

That is, take of rust of iron, or tartarised iron, two drachms.—Conserve of sea-wormwood, or conserve of orange peel, an ounce and a half.—Make into an electuary, of which take a small tea-spoonful, with a glass of red wine, twice a day.

Cuprum.

Copper.—I have no doubt of putting this metal into the list of astringents; for though it possesses very strongly stimulant powers, which often prevent our perceiving its astringency, yet we can, by employing the milder preparations of it, and perhaps by preparing it so as to take away the whole of its stimulant quality, obtain its tonic effects.

I give the blue vitriol (*sulphas cupri*), in the dose of a quarter or half a grain, according to the age of the person; and in repeating the medicine twice a day, I increase the dose to what the stomach will bear without vomiting, but allow it to go so far as to occasion some sickness, and even nausea. This medicine continued for some time, has proved an useful tonic in certain cases of epilepsy and hysteria. On some occasions it has proved diuretic; and on some others anthelmintic. The combination of copper with an ammoniacal salt, I learned from the *Acta Naturæ curios*: and Dr. Cullen introduced it into the practice of this country; and it now stands in the Dispensatory under the title of the *Cuprum ammoniacum**. In many instances it has proved a cure of epilepsy, and thereby discovered its astringent and tonic power. It is employed in the same manner as I have said above of the blue vitriol, by beginning with small doses of half a grain, and increasing these by degrees to what the stomach will bear. I find it com-

* Edinburgh Dispensatory.

monly more manageable than the blue vitriol ; and in many instances have carried the dose to five grains, and in some still farther. In many cases it has proved a cure of epilepsy ; but in many others it has entirely failed in being such. When, in the course of a month, it has not shewn any good effects, I desist from its further use, as I suspect that large quantities of copper introduced, may, like lead, prove hurtful to the body ; and therefore, in cases of periodical epilepsy, after giving the medicine constantly during one interval, if the disease still continues, I afterwards give the medicine only for some days before an expected accession ; and in this manner I have had success.

The escharotic powers of the preparations of copper have been known and employed from the most ancient times, for cleansing foul ulcers, and bringing them to discharge a laudable pus ; but since the introduction of the use of mercury in the 16th century, the preparations of this have been more commonly employed.

The astringent powers of the preparations of copper have especially appeared in the application of them to the eyes ; and we have known a weak solution of verdigris useful in restraining inflammation : but it is so ready to prove irritating to that sensible organ, that a great deal of nicety is necessary in the employment of it : and we seem to have a milder preparation in the aqua sapphirina. It is, however, absurd to order this preparation in such a manner as to allow the strength of it to be liable to much uncertainty ; and the Edinburgh College has properly ordered it so as it may be brought to a standard. It has commonly been supposed, that the aqua sapphirina was suited to take off specks, or opaque spots, that appear upon the cornea, and which has been supposed to imply an escharotic power, but this certainly is seldom the case ; and it seems to act only by an astringent power, diminishing the

impetus of the fluids in the vessels which terminate in the opaque spot.

Plumbum.

Lead.—The astringent powers of the saline preparations of this metal are now sufficiently ascertained ; but at the same time it is equally well known, that all these preparations, and the vapours exhaled from the metal itself, or its calces introduced into the body, discover a sedative power extremely noxious to the human system. It is therefore difficult to determine how far we can employ the astringent and tonic operation of this metal, and be at the same time secure against its deleterious powers, especially as these deleterious powers do not always immediately discover their operation, and very often only after they have long remained latent and unheeded in the body.

This seems to be so much the case at present, that hardly any practitioner will now think of employing any preparations of lead as internal medicines ; but in proportion as the favour of these has declined, that for its external use has greatly increased. We are, however, at a loss to determine positively, what is its operation, or to explain in many cases where its effects are evident, how the supposed operations could produce them. - It is the writing of Mr. Goulard, of Montpellier, that has raised these doubts. It is difficult to deny facts positively asserted ; but we find, in Goulard's writing so many facts not confirmed by our own experience, so many marks of partiality to the medicine he recommends, and so much frivolous theory by which he supports it, that his credit with me is indeed very little. I am much of opinion, that nobody can consult him with safety, without attending to the very judicious and ingenious criticism published on the subject by

Mr. Aiken, of Warrington; and I am disposed to leave my readers to be most properly informed of the virtues of lead applied externally in lotion, poultice, or ointment, to Mr. Aiken's work. I have only this to observe, that Mr. Aiken seems disposed to think, that the saline preparations of lead, externally applied, never enter into the system in such quantity as to affect the general system in the same manner as they commonly do when introduced by the mouth, or when the vapours of lead are applied. But Dr. Percival has given us a fact that may lead us to believe, that Dr. Aiken's opinion is not well founded; and we judge it to be very probable, that though lead applied to the entire surface can hardly enter in such quantity as to be noxious to the system, yet that when applied to an ulcerated surface capable of a promiscuous absorption, it may be taken in such quantity as to affect the general system.

Zincum.

Zinc.—That the saline preparations of this metal act as astringents, we know very well from the operation of white vitriol, so very frequently applied to the eyes. It has been used in different proportions; and when in large proportions, it certainly proves very irritating; but it may certainly be used with great safety in a greater proportion than that of two grains to the ounce of water, as it is in the aqua vitriolica of the last edition of the Edinburgh Dispensatory; and the London College seems to be of that opinion.

The flores zinci, as a matter liable to be corroded by the acid of the stomach, and thereby rendered active, has been lately, upon the authority of the late excellent Dr. Gaubius, introduced into frequent practice as an antispasmodic, or as I consider it, as an astringent and tonic. It has

now been frequently employed here in epilepsy, hysteria, and some other spasmodic diseases, as the chorea, and others. In epilepsy, they never answered with Dr. Gaubius himself; nor have they, that I know of, here, though given in much larger doses than he seems ever to have employed.

In remote parts of the country, in which the flores zinci were not to be had, I have frequently prescribed the vitriolum album; and in some cases with as good effect as in any of those in which I had employed the flores zinci.

The following are the usual formulæ :

R. Zinc. sulphat. scr. 1.—Cons. ros. rubr. q. s.—Ft. pil. 20.—Capt. pil. una vel altera bis terve indies.

That is, take of vitriolated zinc, a scruple.—Conserve of red roses, as much as is sufficient.—Make into twenty pills, one or two of which are to be taken twice or thrice a day.

R. Zinc. oxyd. gr. 4.—Cons. ros. rubr. q. s.—F. bolus bis in die sumend.

That is, take of calcined zinc, four grains.—Conserve of red roses, as much as is sufficient.—Make into a bolus to be taken twice a day.

Silver.

The caustic qualities of acids, though entirely destroyed by their being combined with alkalines and earths, are not so by their being combined with metals. The nitrous acid combined with silver, gives the lunar caustic very commonly employed; and the muriatic acid, in a concentrated state, joined with antimony, gives what is commonly called the butter of antimony, one of the strongest caustics known. These metallic caustics are attended with the

same inconvenience as the simple acids; that is, of being ready to spread beyond the bounds intended for them; but this is more easily managed with respect to the lunar caustic, which can be got in a solid form, than with respect to the butter of antimony, necessarily liquid; and this gives the reason why the latter is more rarely employed.

It is here to be observed, that these corrosive matters are in different degrees of strength; and when they are not sufficient to dissolve the more solid parts, they still may be fit to dissolve those more tender fungous excrescences which arise in ulcers. Thus it happens, that alum having a considerable portion of its watery parts exhaled, and its acid thereby concentrated, is thereby rendered capable of consuming the fungous growth in ulcers. It is, however, always a weak escharotic; and we have a stronger kind in the preparations of mercury and copper. Both these preparations are noted for their cleansing foul sores, bringing them to discharge a proper pus, so necessary to their healing; and I ascribe all this to their escharotic power.

Lunar caustic has of late been applied for the cure of epilepsy, a grain or more being given in the form of pills, increased to four times a day.

Hydrargyrus.

Mercury.—This, as an universal stimulant, and as very commonly reaching the extreme vessels, may be capable of stimulating those of the uterus, and therefore of proving an emmenagogue. Upon this supposition it is introduced here; and, from several trials, I am persuaded that the continued use of mercury has proved a cure of suppressions. How far it may be employed in cases of retention I am uncertain; but am of opinion, that it can be neither so safely nor so effectually employed in these as in the

cases of suppression. It must not, in cases of weakness, be too freely employed. In obstructions of the liver, &c. mercury is often successfully employed.

Balnea Tepida.

However those who never use it may choose to speculate upon the *tepid bath*, experience, in places where it is employed with almost incredible perseverance, is decidedly in favour of its strengthening power. At Pfeffers, in Switzerland, (which is esteemed one of the purest of all waters from impregnation)* from seven to twelve hours are daily spent in the bath, and this, upon the average, is continued for a couple of months. Dr. Tissot says he has been very credibly informed, that at a bathing place in the Valais, patients pass the greater part of the time of their residence in the water. Dr. Marcard attests, that at Baden in Argow, he has himself seen invalids sit four or five hours in the bath. The latest writers concerning the warm bath at Landecke in Silesia, where the bathers are immersed up to the chin, dissuade from too long a continuance in the water. They think six hours sufficient at one time. The usual course here is four, five, or six weeks. Those who use these several baths are, in common, weakly†, nervous people, such

* At Pfeffers, and most of the Swiss baths, it is only the lower half of the body that is immersed. However the upper part is exposed to an atmosphere of warm vapours, which, according to the hypothesis of relaxation, ought to have as bad an effect as mere warm water.—See Marcard, l. c. p. 64.

† To shew to what extent that active enquirer into the effects of bathing, whom I so frequently quote in this section, has carried his practice in cases of weakness, I shall transcribe one of the cases he relates. A woman about 30, had suffered excessively during three years, from pain, anxiety, spasms, and sleeplessness. She took very little food, had, at times, a little

as instead of recovering their health (as they actually do), ought to be dissolved altogether, if the warmth given to the water had a relaxing operation. To many medical men in this country, such relations will appear as paradoxical, as to the generality of uninstructed readers. There can, therefore, be no occasion to add a warning against a rash imitation of the Swiss practice of bathing. The knowledge of the facts may, however, suggest useful reflections, and do away some of those prejudices that cramp the practitioner of physic in his operations, and in both these ways contribute to the ease of the afflicted.

Among the examples that tend to suggest just ideas of the power of the tepid bath, I have been struck with none

feverishness, and was greatly emaciated. For a year she had never been regular. The utmost effort to which she found herself equal, was sitting up in an arm chair, supported by pillows. She required to be turned in bed. She had taken a great deal of bark and other medicines. The disorder had not the appearance of consumption, nor of any incurable lesion of the abdominal viscera. Long continued and great exertions in attending the sick had preceded this illness.

From recollection of somewhat similar cases, the author resolved to recur to the tepid bath, notwithstanding the extreme debility and the prejudices against it. "I did not," says he, "venture to repeat the baths in quick succession, on account of the patient's weakness, and of the effort, attending the operation. Several days were interposed between every two immersions."

"The first trial produced visible benefit. The patient said, she felt stronger after it; and from that day forward, she slept better, though she went into the bath with some dread, having never before used it. After the sixth bath, that is, in about a fortnight, to my astonishment, she was able to rise from her chair. She daily acquired strength under a continuance of the bathing, became regular, and in two months, was perfectly well, and has continued so these three years.—In such a situation, I never saw a more striking effect from bathing. But how the doctrine of relaxation and reduction of strength will apply here, I must leave to others to decide." *Marcard I. c. pp. 57—60.*

more than by that which Dr. L. Frank, physician to the great hospital at Milan, has recorded in a foreign journal (Salzburgh Med. Chir. Journal, f. 1725, ii. 70). "Among the variety of considerations," says he, "which Dr. Marcard alleges to prove, that the tepid bath strengthens in place of weakening, as has been heretofore supposed, I question if there be any so well calculated to support his opinion as a fact perfectly familiar to those in Italy. It is well known, that of the disease called Pelagra, which is exceedingly frequent among the peasants of Lombardy, one of the chief symptoms is excessive debility. This debility cannot be more certainly removed by any means than by the use of the tepid bath. It is so great, that many patients are obliged to be carried, though the bath is not above forty paces from the ward. Many who can walk, are yet so weak that they cannot get into the water without support. The appearance of these people at going in and coming out, is truly miserable. Without being led by the attendants, they would stagger like drunken persons. In the space of four or, at most, of six weeks, they are commonly so much restored by the use of the warm bath, as to be able to return to their friends and their ordinary employments."

Pediluvium.

Washing the feet.—This invites from the head, and may be said to be a stimulus to the whole frame. It is necessary after it to go into a warm bed. In forwarding the salutary return of the period in women, it has often been successfully employed.

Electricity.

The identity of the *electric fluid* and lightning, has been clearly ascertainnd, and great hopes at first naturally arose that this so powerfully an engine of destruction, might, in scientific hands, prove a power productive of much good in certain diseases.

Although immense machines have been constructed, I doubt whether any patients confined to their beds, have been insulated, and filled with the electric fluid. Nothing of this kind, I know, has been done in putrid fever, and a variety of other diseases. This mode of electrifying has been used rather as a placebo to gain money from the patient, than with any direct views of experimental enquiry. If seeds germinate much sooner when insulated, without doubt, experiments of the same kind on the human body, which can be attended with no risk, deserve to be made. The electric aura in chronic inflammations of the eye, has certainly done good.

The next mode of employing electricity has been by sending sparks to the patient, or insulating and filling him with electricity, and then drawing sparks from his person. This produces an immediate warmth and action on the parts so electrified, and if carried to any great extent, would raise a blister as strongly as the other vesicatories. The circulation is in this way more encreased than even by the flesh-brush. In local affections it answers all the commendation given by its advocate, and hence its success in glandular swellings, in chilblains, and in speedily removing a black eye, or other congestions of blood. In muscular affections, the sequel of acute and gouty rheumatism, it does more than all the forms of embrocation. In deafness it certainly deserves to be tried, as also in blindness; and

in paralytic affections it serves to amuse the enfeebled mind and body of the sufferer.

SECT. XCI.

Anthelmintics.*

It is a known fact that thousands of children lose their lives annually by WORM-CAKES advertised by the *legal* and infamous destroyers of their fellow-creatures, whom, for the sake of the *licence*, are still suffered to go on in their work of death in an enlightened period, and alas! *no patriot* has as yet stood up to remedy this growing evil. The means advertised are, either arsenic, or other dangerous poisons, filings of pewter, containing often much arsenic, or powerful purges, and both age and sex, and constitution, are, of necessity, put out of the question, and the inward gnawings of the young sufferer are alone expressed by the writhings and contortion of his face and body.—The calculation of the *quack* is thus; “I was in my youth a chimley-sweeper, next a scavenger, and now I am a tinker, or mender of kettles; this is as much allied to medicine, as shoe-making is to divinity. My brother, the cobbler, has made a decent livelihood, and is much respected, by turning from mending soles, to converting of souls, and he is a methodist preacher, and why should not I ride in my coach? I have no *mountebank*, to be sure, but I can circulate hand-bills. In London alone there are a million of people. If one dies in seven years, many are ill before this comes, and I may reckon 25,000 are ill. If my bill reaches one in a hundred, and this one should buy only

* From *αντι*, against, and *ελμινς*, a worm

a guinea's worth of my stuff, this would give me 250l. a year, but this is reckoning too fast, there are so many to despise my bad spelling and lies, and so many dead people, whose friends tell tail, and so many doctors too, that I must look to the country, and there I find fifteen million of people, and my stuff sells as well in the country as in town, or better, not needing to see the folk; and as I live upon onions, and follow my trade for a time, and will advertise more and more as I get on, the odds are much against me, if with the *King's Arms, authority of Parliament, extracts from the Gazettes*, but that I ride at last in my coach; nor is his conjecture wrong, as we have daily instances. The water-casters, who see the disease, age, and sex of the patient in the urine, and hap-hazard kill or cure, the medicine being powerful, and the disorder sthenic, or asthenic, have not half as much chance of a fortune, as the advertising *quack*, and we find, therefore, there are fewer water-doctors than doctors of the other description. But it is time we should come to the formulæ, trusting that the necessity of a stop being put to such *wicked* abuses, will meet some *virtuous* legislator, who will remedy this evil, to whom nothing farther need be said.

Before I make my observations on anthelmintic remedies, I shall first beg leave to give some experiments which I made in the year 1771, upon the common earth-worm, in order to ascertain the anthelmintic virtues of a variety of substances. I made choice of the earth-worm for this purpose, as it is, according to naturalists, exactly the same in its structure, manner of subsistence, and mode of propagating its species, with the round worm of the human body.

In the first column I shall set down, under distinct

heads, the substances in which worms were placed ; and the second and third columns the time of their death, from the action of these substances upon them.

I. BITTER and ASTRINGENT SUBSTANCES.	Hours.	Minutes.
Watery Infusion of Aloes....	2	48
———— of Rhubarb.....	1	30
———— of Peruvian bark	1	30
II. PURGES.		
Watery Infusion of Jalap....	1	—
———— of Bears-foot.....	1	17
———— of Gamboge.....	1	—
III. SALTS.		
1. <i>Acids.</i>		
Vinegar.....	—	1½ convulsed.
Lime Juice.....	—	1
Diluted nitrous Acid	—	1½
2. <i>Alkali.</i>		
A Watery Solution of Salt of Tartar	—	2 convulsed, throwing up a mucus on the surface of the water.
3. <i>Neutral Salts.</i>		
In a watery Solution of common Salt	—	1 convulsed.
———— of Nitre	—	ditto.
———— of Sal Diuretic	—	ditto.
———— of Sal Ammoniac	—	1½
———— of common Salt and Sugar	—	4
4. <i>Earthy and Metallic Salts.</i>		
In a watery Solution of Epsom Salt	—	15½
———— of Rock Alum	—	10
———— of Corrosive Sublimate	—	1½ convulsed.
———— of Calomel	—	49
———— of Turpeth Mineral . . .	—	1 convulsed.
———— of Sugar of Lead.....	—	3
———— of green Vitriol	—	1
———— of blue Vitriol.....	—	10
———— of white Vitriol	—	30

IV. METALS.	Hours.	Minutes.
Filings of Steel.....	—	25½
Filings of Tin	1	—
V. CALCAREOUS EARTH.		
Chalk	2	—
VI. SEDATIVE SUBSTANCES.		
Watery Infusion of Opium ..	—	11½ convulsed.
— of Carolina Pink-root..	—	33
— of Tobacco	—	14
VII. ESSENTIAL OILS.		
Oil of Wormwood	—	3 convulsed.
— of Mint	—	3
— of Caraway Seed.....	—	3
— of Amber	—	1½
— of Anniseed	—	4½
— of Turpentine	—	6
VIII. ARSENIC.		
A watery Solution of white Arsenic	near 2	—
IX. FERMENTED LIQUORS.		
In Madeira Wine	—	3 convulsed.
— Claret	—	10
X. DISTILLED SPIRIT.		
Common Rum	—	1 convulsed.
XI. THE FRESH JUICES OF RIPE FRUITS.		
The Juice of red Cherries...	—	5½
— of black ditto	—	5
— of red Currants	—	2½
— of Gooseberries	—	3½
— of Whortleberries.....	—	12
— of Blackberries	—	7
— of Raspberries	—	5½
— of Plumbs	—	13
— of Peaches	—	25
— of Watermelons, no effect	—	—
XII. SACCHARINE SUBSTANCES.		
Honey	—	7

	Hours.	Minutes.
Molasses	—	7
Brown Sugar	—	30
Manna	—	2½
XIII. In AROMATIC SUBSTANCES.		
Camphor	—	5
Pimento	—	3½
Black Pepper	—	45
XIV. FOETID SUBSTANCES.		
Juice of Onions	—	3½
Watery Infusion of Assafoetida	—	27
—— Stantonicum, or Worm Seed	1	—
XV. MISCELLANEOUS SUBSTANCES.		
Æthiops Mineral	2	—
Sulphur	2	—
Solution of Gunpowder	—	1½
—— of Soap	—	19
Oxymel of Squills	—	3½
Sweet Oil*	2	30

In the application of these experiments to the human body, an allowance must always be made for the alteration which the several anthelmintic substances that have been mentioned, may undergo from mixture and diffusion in the stomach and bowels.

In order to derive any benefit from these experiments, as well as from the observations that have been made upon anthelmintic medicines, it will be necessary to divide them into such as act,

I. Mechanically.

II. Chemically upon worms; and,

III. Into those which possess a power composed of chemical and mechanical qualities.

I. The mechanical medicines act indirectly and directly upon the worms.

Those mechanical medicines which act directly upon the worms, are cowhage* and powder of tin. I had heard, says Mr. Chamberlaine, so much of the cowhage, or cowitch, that I resolved to make trial of it.

But the different modes of exhibiting it, were as various as the persons who took upon them that office. One administered it in melasses. Castor oil was the favourite vehicle of a second; and a third insisted, that it was of no service unless mixed with honey.

The greater number agreed in giving melasses the preference; but there was even among these, a considerable disagreement with regard to the proportions to be observed in the mixture. While some cautiously put but two pods of the cowhage into a quart of melasses, others boldly stirred up two dozen in a like quantity. Some again would have six pods to be sufficient; and others imagined that some secret virtue, or charm, was to be expected, from having the number neither greater, nor less, than exactly nine.

By some, the setæ contained on the outside of a single pod, mixed with one or two table-spoonfuls of syrup, honey, or melasses, was given for a single dose, without distinction, to young and old. By others, a quantity of each ingredient was mixed together, without bearing any exact proportion to each other, farther than was merely sufficient to bring the composition to the consistence of an electuary; and one, two, or three tea-spoonfuls given as a dose to children, and one, and sometimes two table-spoonfuls to adults.

* *Dolichos Pruriens*, of Linnæus.

As far as I could learn, however different the compositions and proportions of the ingredients, the effects were found to be pretty much the same in all ages, sexes, and constitutions.

I considered, that the wonderful efficacy so generally attributed to the cowhage, could not be supposed to arise from any specific medicinal quality residing in it, so much as from the sharpness and elasticity of the setæ, with which the pods are covered, which take the same effect on worms, as they do when applied to our skin. The setæ piercing, vellicating, and tormenting them in such a manner, as obliges them to let go their hold; acting like so many needles, as may be plainly demonstrated by viewing the setæ through a microscope; which shews them to be a number of long spiculæ, needle-shaped, hollow, transparent, and armed with points, exquisitely sharp and fine.

The idea, that their action is merely mechanical, is supported by the observations of several very judicious enquirers, who have made trial of the cowhage, particularly Dr. Leake; who, "in his lectures on the theory and practice of midwifery, and diseases incident to children," enumerates the cowhage among the most effectual of those remedies given to children for worms. He supposes that it acts in the same manner as hair, cut fine, and given with the same intention, but much more effectually, because of its inflexibility, and the exquisite, and almost inconceivable sharpness of its points.

Curious to know how far the application of the setæ to the external coats of worms bred in the human body would affect those animals when expelled from the body, I waited not long before I had an opportunity of making the experiment.

A calabash full of very large ones, of the teres kind, in full vigour, voided by a poor emaciated patient, was brought to me. Among these, I sprinkled some of the setæ. For a minute or two no visible effect was produced ; but in a little time they began to writhe and twist themselves in an unusual manner, and exhibited evident signs of extreme torture. I took one of the worms, and viewing it through a magnifying glass, perceived that several of the setæ had pierced very deep, and others were sticking loosely in various parts of its body, but that none of the spiculæ, which had once entered into the skin, dropped off.

Convinced in a short time both from what I had heard, and from my own experiments, on the internal exhibition of cowitch, of the safety and efficacy of this incomparable medicine, I laid aside the cabbage-tree-bark, and for several years have used no other vermifuge than this.

My usual way of preparing and administering it, has been in the form of an electuary, with honey, melasses, or syrup, of a thick consistence, without observing any very exact proportion of the quantity of setæ.

Of this electuary a tea-spoonful is a sufficient dose to young children ; and to adults, one, or even two table-spoonfuls in a morning fasting. This may be repeated for two or three mornings ; but in general, there is seldom occasion to go beyond the third dose ; and a gentle purge of some kind or other, commonly completes the cure for the time.

The above-mentioned vehicles, (honey, &c.) blunt the spiculæ, and prevent their injuring the fauces and œsophagus, and are preferable to an oily vehicle, because, being diluted in the stomach, by the succus gastricus, the spiculæ are set free, and regaining their elasticity, enter into action ; whereas oil, being not easily soluble by the

secreted fluids of the stomach, still continues to sheath the points of these little spiculæ, and carries them through that viscus, and the intestines, without setting them free and by its lubricating quality, prevents them from taking effect, or injuring the worms they are sent to destroy. Oil is, therefore, an improper vehicle; and this will appear still plainer, if we consider, that to defend our hands from the troublesome effects of the setæ, when handling cowitch, it is necessary to oil the fingers.

No anatomist will ask, whether these spiculæ may not be injurious to the coats of the stomach and intestines? But, as I have been asked this question by many people, who, ignorant of the structure of the intestines, and the nature of this mucus, were apprehensive of danger, and therefore afraid to venture on the medicine; it may not be amiss to remark, for the satisfaction of such as are in doubt concerning that point, that if a little honey or treacle is sufficient to defend the tender nervous papilli of the mouth and fauces, from the troublesome effects of the setæ, (which, when applied externally to any part of our skin, cause a most tormenting and intolerable itching, sometimes almost even to madness) certainly the mucus of the stomach and intestines will be very sufficient to defend those parts from the irritation of the setæ.

Nevertheless, however inoffensive in general the cowhage may be, reason will dictate to us, that where the mucus of the stomach and intestines is abraded, or lessened, from dysentery, cholera-morbus, or any other cause whatsoever; or where there is a tendency towards inflammation in any part of the intestinal canal, the exhibition of this medicine cannot be unattended with danger.

I shall not go so far as to say, in praise of this my favourite medicine, that I never knew it to fail; but I will say, that I have experienced more certain good

effects, and fewer ill consequences, than from any other medicine, given with the same intention; insomuch, that I have, since I first began to exhibit the cowhage, had no occasion to look for any other vermifuge*.

The last of these medicines, tin, has been generally supposed to act chemically upon the worms, from the arsenic which adheres to it; but from the length of time a worm lived in a solution of white arsenic, it is probable the tin acts altogether mechanically upon them.

Those which act indirectly are, vomits, purges, bitter and astringent substances, particularly aloes, rhubarb, bark, bear's-foot, and worm-seed. Sweet-oil acts indirectly and very feebly upon worms. It was introduced into medicine from its efficacy in destroying the botts in horses; but the worms which infest the human bowels, are of a different nature, and possess very different organs of life from those which are found in the stomach of an horse.

II. The medicines which act chemically upon worms, appear, from our experiments, to be very numerous.

Nature has wisely guarded children against the morbid effects of worms, by implanting in them an early appetite for common salt, ripe fruits, and saccharine substances; all which appear to be among the most speedy and effectual poisons for worms. Let it not be said, that nature here counteracts her own purposes. Her conduct in this business is conformable to many of her operations in the human body, as well as throughout all her works. The

* Vide a Practical Treatise on the Efficacy of Stizolobium, or Cowhage, (the *dolichos pruriens* of Linnæus) internally administered, in diseases occasioned by Worms. To which are added, Observations on other anthelmintics of the West-Indies, by William Chamberlaine, an eminent surgeon and philanthropist.

bile is a necessary part of the animal fluids, and yet an appetite for ripe fruits seem to be implanted chiefly to obviate the consequences of its excess, or acrimony, in the summer and autumnal months.

The use of common salt, as an anthelmintic medicine, is both ancient and universal. Celsus recommends it. In Ireland it is a common practice to feed children, who are afflicted by worms, for a week or two upon a salt-sea weed, and when the bowels are well charged with it, to give a purge of wort, in order to carry off the worms, after they are debilitated by the salt diet. I have administered many pounds of common salt coloured with cochineal, in doses of half a drachm, upon an empty stomach in the morning, with great success in destroying worms.

Ever since I observed the effects of sugar and other sweet substances upon worms, I have recommended the liberal use of all of them in the diet of children, with the happiest effects. The sweet substances probably act in preventing the diseases from worms in the stomach only, into which they often insinuate themselves, especially in the morning. When we wish to dislodge worms from the bowels by sugar or melasses, we must give these substances in large quantities, so that they may escape in part the action of the stomach upon them.

I can say nothing, adds Dr. Rush, from my own experience of the efficacy of the mineral salts, composed of copper, iron, and zinc, combined with vitriolic acid, in destroying worms in the bowels. Nor have I ever used the corrosive sublimate in small doses as an anthelmintic.

I have heard well-attested cases of the efficacy of the oil of turpentine in destroying worms.

The expressed juices of onions and of garlic are very

common remedies for worms. From one of the experiments it appears that the onion-juice possesses strong anthelmintic virtues.

I have often prescribed a tea-spoonful of gunpowder in the morning upon an empty stomach, with obvious advantage. The active medicine here is probably the nitre.

I have found a syrup made of the bark of the Jamaica cabbage-tree*, to be a powerful as well as a most agreeable anthelmintic medicine. It sometimes purges and vomits, but its good effects may be obtained without giving it in such doses as to produce these evacuations.

There is not a more certain anthelmintic than Carolina pink-root†. But as there have been instances of death having followed excessive doses of it, imprudently administered; and as children are often affected by giddiness, stupor, and a redness and pain in the eyes, after taking it, I acknowledge that I have generally preferred to it, less certain, but more safe medicines for destroying worms.

III. Of the medicines whose action is compounded of mechanical and chemical qualities, calomel, jalap, and the filings of steel, are the principal.

Calomel, in order to be effectual, must be given in large doses. It is a safe and powerful anthelmintic. Combined with jalap, it often brings away worms when given for other purposes.

Of all the medicines that I have administered, I know of none more safe and certain than the simple preparations of iron, whether they be given in the form of steel-filings or of the rust of iron. If ever they fail of success, it is because they are given in too small doses. I generally

* *Geoffrea*, of Linnæus.

† *Spigelia Marylandica*, of Linnæus.

prescribe from five to twenty grains every morning, to children between one year and ten years old ; and I have been taught by an old sea captain, who was cured of a tænia by this medicine, to give from two drachms to half an ounce of it, every morning, for three or four days, not only with safety, but with success.

The usual formulæ are :—

R. Gambog. gr. 2.—Hydr. Submuriat. gr. 5.—Jalap. gr. 10.—Ft. pulv. primo mane sumend.

That is, take of gamboge, two grains.—Calomel five grains.—Jalap, ten grains.—For a powder to be taken early in the morning.

R. Hydr. submuriat.—Pulv. e chel. cancror. comp. aa. gr. 3.—Antimon. tart. gr. $\frac{1}{8}$.—Ft. pulv. primo mane sumend.

That is, take of calomel,—Compound powder of crabs' claws, of each three grains.—Tartarized antimony, the eighth of a grain.—For a powder, to be taken early in the morning.

R. Scammon. Antim. pulv. aa. gr. 2.—Hydr. submuriat. gr. 10.—Ft. pulv. primo mane sumend.

That is, take of Scammony.—Antimonial powder, two grains.—Calomel ten grains,—For a powder, to be taken early in the morning.

Hydr. submuriat. gr. 4.—Rhei pulv. gr. 10.—Jalap. pulv. gr. 12.—M. F. pulv. mane sumend. in coch. uno syrup. violarum.

That is, take of calomel, four grains.—Rhubarb, ten grains.—Jalap, twelve grains.—For a powder, to be taken in the morning in a spoonful of syrup of violets.

R. Pulv. stan. scr. 1.—Pulv. Rhei. gr. 4.—Pulv. antim. gr. 3.—Ft. pulv. horâ somni sumend.

That is, take of powder of tin, a scruple.—Rhubarb, four grains.—Antimonial powder, three grains.—This is to be taken at bed-time.

R. Pulv. stan. dr. 1.—Hydr. submuriat. gr. 1.—Ft. pulv. in melle bis quotidie sumantur.

That is, take of powder of tin, one drachm.—Calomel, a grain.—For a powder to be taken mixed in honey twice a day.

R. Aloes socot. dr. $\frac{1}{2}$.—Sapon. dr. $1\frac{1}{2}$.—Syr. simp. q. s. Ft. pil. 30, quarum cap. pil. 3, sing. noctibus.

That is, take of socotorine aloes, half a drachm.—Soap, a drachm and a half.—Simple syrup, as much as is sufficient.—Make into thirty pills, of which take three every night.

R. Pulv. aloet. cum fer. dr. 1.—Syr. zingib. q. s.—Ft. pil. 16 sumantur duo vel tres sing. noctibus.

That is, take of aloetic powder with steel, a drachm, simple syrup as much as is sufficient.—Make into 16 pills, of which take two or three every night.

R. Aloes socot. dr. $\frac{1}{2}$.—Lact. vaccin. unc. 8.—Tere simul ut fiat enema tepidum injiciendum.

That is, take of socotrine aloes, half a drachm.—Milk, eight ounces.—Mix them for a glyster to be thrown up warm.

R. Dolic. rub. rigid. (Ph. Ed.) dr. 1.—Syr. simp. q. s. Ft. elect.—Capt. coch. minimum, sing. auroris, ad tertiam usque vicem.

That is, take of cowitch (Edin. Dispensatory) a drachm; simple syrup, as much as is sufficient.—Make into an electuary, of which take a small tea-spoonful for three successive mornings.

To those who have an opportunity, we would refer them to Mr. Chamberlaine, Surgeon and Apothecary, Aylesbury-Street, whose experience with the cowitch has been great; this practice having been introduced by him.

R. Spigel. rad. unc. $\frac{1}{2}$.—Aq. fervent. lib. 1.—Macerate et

liquori colato adde tinct. rhei. unc. 2.—Capt. coch. 3, bis quotidie.

That is, take of Indian pink, half an ounce.—Boiling water, a pint.—Macerate, and add to the strained liquor tincture of rhubarb, two ounces.—Take three table-spoonfuls of this twice a day.

Having finished with the formulæ, let me advise the student in medicine to distrust his memory, and to copy them carefully into his pocket-book, and to make it his *Vade Mecum*, and with much facility with a little practice, he will be able to alter them as the age, constitution, and circumstances of his patients may require.

S E C T. XCII.

The Objection to Emetics and Purges, in Asthenic Diseases, Answered.

To *prepare* for bark and other tonics is an old maxim, and, by this preparation was meant an emetic, or purge, or both. Dr. Brown would not admit of this, and said, that it was like pouring water and oil at the same time to make a fire, and he excluded the use of vomits and purges altogether in asthenic diseases. We who seek only after truth, are obliged to confess that in this, there appears a great defect, as daily practice must evince, that in diseases of debility, the humid phlegmatic state of the frame is, indeed, too obvious. This may be, perhaps, explained in the following way.

We have two sorts of vessels. The agents or vessels that convey, are the arteries with their appendages: those that carry away, are the absorbents. Of that which is

conveyed, and that which is carried away, the quantity and quality differ according to the state of these two sets of vessels. Thus in a strong man, the discharge from an ulcer shall perceptibly differ from the discharge from an ulcer in a weak man—the matter filling the pustules of the small pox shall differ in different constitutions—but make the weak man stronger by wine, food, or medicine, and the discharge or matter in the pustules, shall alter in quantity and quality. At the same time, the strokes of the arteries may be felt to be altered in number and force.

When a strong, cold wind blows upon the eye, the liquid, which in a healthy state of that organ but just suffices to keep the surface moist, overflows in profusion. We see the same thing happen with regard to the nostrils. In these cases the, evident destruction of the balance between the two sets of vessels, appears to depend on the lessened power of the absorbent vessels. Many phænomena render it credible, that by the first impression of cold (whether on account of their position or structure) these are commonly weakened more than the arteries. When the surface of the lungs, in the act of respiration, is repeatedly swept by cold air, the balance between the opposite sets of vessels is altered; and the more perhaps in favour of the arteries, as the organ or the constitution is weaker. The weaker also the absorbent vessels, the longer before the disturbed equilibrium is restored. A blister continues to discharge much longer in the weak than the strong.

When any of the above-mentioned surfaces are inflamed, the balance is also lost. At first there is too little moisture. Dryness is felt on sensible surfaces, as that of the nostrils, or huskiness in the throat. Here the absorbents act with unequally increased powers.—Afterwards there is an excess of secreted moisture, as is seen in the

expectoration, and in the discharge from the nostrils. In old, weak people, a bad cold often occasions suffocation ; so great is the quantity of secretion, or so little that of absorption by the vessels on the surface of the lungs : and in the greater or less viscosity, the yellowness or greenness of the expectorated matter, a variation of quality is manifest. Diseased secretions from the lungs differ in all degrees, from the tenuity almost of water, to the hardness of stone. The secretion, in these cases, is not confined to the surface ; it extends to the whole substance of an organ, which is lax, spongy, or full of innumerable small cells, communicating with one another. In colds, the thickening of the membrane of the nose, and the sense of fulness in the chest, probably arise in part from excess of interior secretion, without adequate increase of absorption. Emetics here are often found of use to excite the absorbent system, and dislodge the adhering mucus of the lungs.

We come now to the consideration of the stomach. When this viscus is in a state of disease it is filled with mucus, and crudities are discovered in this organ, marked by a great loss of appetite, by a sense of weight and uneasiness in the stomach, and particularly by the eructation of imperfectly digested matters.

This is to be relieved by exciting vomiting ; and the use of this remedy, therefore, usually and properly begins the cure of this disease. The vomiting may be excited by various means, more gentle or more violent. The former may answer the purpose of evacuating the contents of the stomach ; but emetics, and vomiting, may also excite the ordinary action of the stomach ; and both, by variously agitating the system, and particularly by determining to the surface of the body, may contribute to remove the causes of the disease. But these latter effects can only be

obtained by the use of emetics of the more powerful kind, such as the antimonial emetics especially are.

The second symptom to be palliated, is an excess of acidity, either in quantity or quality, in the contents of the stomach. In man there is a quantity of acescent aliment almost constantly taken in, and, as I think, always undergoes an acetous fermentation in the stomach; and it is therefore that, in the human stomach, and in the stomachs of all animals using vegetable food, there is always found an acid present. This acid, however, is generally innocent, and occasions no disorder, unless either the quantity of it is very large, or the acidity proceeds to a higher degree than usual. But, in either of these cases, the acid occasions various disorders, as flatulency, eructation, heartburn, gnawing pains of the stomach, irregular appetites and cravings, looseness, griping, emaciation, and debility. To obviate or remove these effects aggravating and continuing the disease, it is not only necessary to correct the acid present in the stomach; but, especially as this acid proves a ferment determining and increasing the acescency of the aliments afterwards taken in, it is proper also, as soon as possible, to correct the disposition to excessive acidity.

The acidity present in the stomach may be corrected by the use of alkaline salts, or absorbent earths; or by such substances, containing these, as can be decomposed by the acid of the stomach. Of the alkalines, the caustic is more effectual than the mild; and this accounts for the effects of lime-water. By employing absorbents, we avoid the excess of acids, which might sometimes take place. The absorbents are different, as they form a neutral more or less laxative; and hence the difference between magnesia alba and other absorbents. It is to be observed, that alkalines and absorbents may be employed to excess; as, when employed in large quantity, they may deprive the

animal fluids of the acid necessary to their proper composition.

The disposition to acidity may be obviated by avoiding acescent aliments, and using animal-food little capable of acescency. This, however, cannot be long continued without corrupting the state of our blood; and as vegetable food cannot be entirely avoided, the excess of their acescency may in some measure be avoided, by chusing vegetable food the least disposed to a vinous fermentation, such as leavened bread and well fermented liquors, and, instead of fresh native acids, employing vinegar.

The acid arising from acescent matters in a sound state of the stomach, does not proceed to any high degree, or is again soon involved and made to disappear: but this does not always happen; and a more copious acidity, or a higher degree of it, may be produced, either from a change in the digestive fluids, become less fit to moderate fermentation and to cover acidity, or from their not being supplied in due quantity. How the former may be occasioned, we do not well understand; but we can readily perceive that the latter, perhaps the former also, may proceed from a weaker action of the muscular fibres of the stomach. In certain cases, sedative passions, immediately after they arise, occasion the appearance of acidity in the stomach which did not appear before; and the use of stimulants often corrects or obviates an acidity that would otherwise have appeared. From these considerations we conclude, that the production and subsistence of acidity in the stomach, is to be especially prevented by restoring and exciting the proper action of it, by the several means before mentioned.

We proceed now to the bowels. Dr. Whytt has justly observed, that when much phlegm is collected in the stomach and intestines, their nerves are rendered less

sensible of the stimulus of the aliments, their absorbent vessels are partly obstructed, and the gastric and intestinal lymph are more sparingly secreted, or at least become more viscid.

From multiplied observations, says the Rev. Mr. Townsend, I have been long since persuaded, that hypochondriac torpor originates in viscid mucus, and I have lately been confirmed in this idea by seeing a patient of the melancholic temperament, whose pulse at the age of about fifty-six, beat only from 45 to 50 in a minute.

The physician, who attended him, did me the honour to acquaint me with the circumstance already mentioned, and informed me, that, neither by steel, nor by the most powerful cordial stimulants, could he excite the system, or increase either the pulsation of the artery or the vital heat.

I suggested the idea, that the reason why he could not excite the system was, that in the intestines there was something interposed between his medicines and the animated fibre. He was pleased with the idea, and determined to cleanse the alimentary canal from the viscid mucus; but before he could adopt this plan the patient died.

Having an opportunity to talk with his apothecary, I discovered that this gentleman had long been subject to hypochondriasis and to asthma, that he had been almost in the daily habit of taking squill vomits, which always brought off from his stomach, and frequently procured by stool, a quantity of tough and viscid phlegm, and that prior to his last attack of asthma, the complaint for which he consulted his physician, he had for a considerable time omitted his emetics.

Professor Macbride, of Dublin, judiciously observes, that the most common source of disturbance in the nervous system is acrid and offensive matter, either in the

stomach or flexure of the duodenum; of which the symptoms are, in the tongue foulness, sordes, and thick sloughs; in the mouth a taste, bitter, sour, rancid, putrid; nausea and loss of appetite; pain in the left orifice and upper part of the stomach; weight and oppression about the præcordia; fulness of the hypochondria; heaviness, giddiness, and pain in the head; shivering and coldness of the extremities, with lassitude and loss of strength.

Professor Hoffman speaks of acrid, bilious matter in the intestines as the cause of spasm.

Materia acris biliosa flatuum & spasmodum genetrix.

Tom. II. p. 199.

“Acrid bilious matter is the cause equally of wind as of spasm.”

To clear the bowels of this saline, drastic purges* must be occasionally used, for then we arrive at the living fibre: for as Mr. Townsend justly observes, no effects will be produced by our medicines until this is the case. Thus if a drop of water is put into a candle, how does it sputter until this is removed, although the elements for combustion be proper, and upon doing this, we have immediately a vigorous flame.

Also during the exhibition of tonics, costiveness must be always obviated. There is so much connection between the several portions of the alimentary canal with respect to the peristaltic motion, that, if accelerated or retarded in any one part, the other parts of it are commonly affected in the same manner. Thus, as the brisker action of the stomach must accelerate the action of the intestines, so the slower action of the intestines must in some measure retard that of the stomach. It is therefore of consequence

* Calomel effects this more than any other purge. It may be called the brush of the intestines. If a pill of two grains be taken at night, it should be worked off the following morning with senna.

to the proper action of the stomach, that the peristaltic motion of the intestines determining their contents downward, be regularly continued ; and that all costiveness, or interruption of that determination, be avoided. This may be done by the various means of exciting the action of the intestines : but it is to be observed here, that as every considerable evacuation of the intestines weakens their action, and is ready therefore to induce costiveness when the evacuation is over ; so those purgatives which produce a large evacuation, are unfit for correcting the habit of costiveness. This, therefore, should be attempted by medicines which do no more than solicit the intestines to a more ready discharge of their present contents, without either hurrying their action, or increasing the excretions made into their cavity ; either of which effects might produce a purging. There are, I think, certain medicines peculiarly proper on this occasion, as they seem to stimulate especially the great guts, and to act little on the higher parts of the intestinal canal.*

SECT. XCVII.

The Cure of Dropsy explained.

We come now to another consideration. Remedies of a debilitating nature have been recommended in dropsy, such as are employed in the sthenic diseases, and in a philosophical work this certainly merits explanation.

In the first place it is generally observed, that during the nausea of an emetic, especially by that of squills, the motions of the heart and arteries are diminished, and

* As the Aloetic pill.

hence a less expense of the irritable principle being wanted for the performance of their office, the *absorbent system* then possesses the hoarded wealth, if I may be allowed the expression, and resumes a temporary energy.

This is more remarkable still for the use of the foxglove. It lowers the pulse sometimes under forty, and in this state of quiescence of the aortal system, the absorbents acquire energy from the stock of irritability not required by the heart and arteries, and a sudden cure of dropsy by this means has been effected.

Sometimes dropsies have been cured by drastic purges, as gamboge, jalap, and strong saline purgatives: This may be accounted for by the sudden depletion of the system, when the absorbents acquire fresh energy, their power (as is seen in hunger) being according to the wants of the system.

A long abstinence from food, and liquids, has also produced the same effect: but the curative indication is in tonic powers, as in the other diseases of asthenia, which should be employed immediately after the water has been evacuated.

THE END.

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